Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

a 513 211
P8 A3

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Plant Industry, Soils, and Agricultural Engineering

THE NATIONAL POTATO-BREEDING PROGRAM
1947

* * * * * * *
* * * * *
* * *
*

USDA
NAT'L AGRIC LIBRARY
2000 AUG -8 P 6:28
CURRENT SERIAL RECORDS
AGRICULTURE RESEARCH

By
Division of Fruit and Vegetable Crops and Diseases
and
the State Cooperators

* * * * *
* * *
*

(18th Annual Report to Cooperators)

Plant Industry Station

Beltsville, Md.

March 15, 1948

VF - POTATOES--BREEDING

TABLE OF CONTENTS

Page

NATIONAL POTATO-BREEDING PROGRAM, 1947---------- 1

U. S. DEPARTMENT OF AGRICULTURE
Plant Industry Station, Beltsville, Md., and Chapman and Aroostook Farms, Presque Isle, Maine
F. J. Stevenson, R. V. Akeley, and E. S. Schultz (Plant Industry Station, Beltsville, Md., and Aroostook Farm, Presque Isle, Maine)---------- 4

Southern States Project
T. P. Dykstra (USDA, University Station, Baton Rouge 3, La.)---------- 18

Potato Field Station, Greeley, Colo.
W. C. Edmundson (Potato Field Sta., USDA, Greeley, Colo.)---------- 20

USDA, Ft. Collins, Colo.
L. A. Schaal (Colo. A & M College, Ft. Collins, Colo.)---------- 21

ALABAMA
Frank A. Garrett (Gulf Coast Substation, Fairhope, Ala.)---------- 26
C. L. Isbell (Alabama Polytechnic Institute, Auburn, Ala.)---------- 27

ARIZONA
Alton Finch (U. S. Yuma Field Station, Yuma, Ariz.)---------- 29
A. L. Harrison (Vegetable Research Farm, Tempe, Ariz.)---------- 30

CALIFORNIA
Glen N. Davis (Calif. Agr. Expt. Sta., Davis, Calif.)---------- 32

CONNECTICUT
L. C. Curtis and John Scarchuk (University of Conn., Storrs, Conn.)------ 36

FLORIDA
A. H. Eddins and E. N. McCubbin (Fla. Agr. Expt. Sta., Hastings, Fla.)--- 37
James C. Hoffman (Fla. Agr. Expt. Sta., Belle Glade, Fla.)---------- 37

HAWAII
W. A. Frazier (Agr. Expt. Sta., Honolulu, Hawaii)---------- 41

INDIANA
Kent Ellis (Ind. Agr. Expt. Sta., La Fayette, Ind.)---------- 42

IOWA
C. E. Peterson and E. S. Haber (Iowa State College, Ames, Iowa)---------- 42

LOUISIANA
J. C. Miller (La. Agr. Expt. Sta., Agricultural Center, Baton Rouge, La.)- 43

MAINE
Reiner Bonde (Maine Agr. Expt. Sta., Orono, Maine)---------- 44
Donald Folsom (" " " " " ")---------- 46
G. W. Simpson (" " " " " ")---------- 48

Page

MARYLAND
R. A. Jehle (University of Maryland, College Park, Md.)---------- 49

MICHIGAN
E. J. Wheeler and H. C. Moore (Mich. State College, East Lansing, Mich.)--- 55

MINNESOTA
F. A. Krantz, Carl J. Eide, and C. O. Turnquist (Minn. Agr. Expt. Sta., University Farm, St. Paul, Minn.)---------- 57
M. J. Thompson (Northeast Expt. Sta., Duluth, Minn.)---------- 61

NEBRASKA
H. O. Werner (Nebr. Agr. Expt. Sta., Lincoln, Nebr.)---------- 62

NEW JERSEY
J. C. Campbell (N. J. Agr. Expt. Sta., New Brunswick, N. J.)---------- 69

NEW YORK
F. M. Blodgett, Wilson L. Smith, Jr., and Robert E. Kilkinson (N.Y. (Cornell) Agr. Expt. Sta., Ithaca, N.Y.)---------- 70
E. V. Hardenburg and Herbert Findlen (N.Y. (Cornell) Agr. Expt. Sta., Ithaca, N.Y.)---------- 79
J. R. Livermore (N.Y. (Cornell) Agr. Expt. Sta., Ithaca, N.Y.)---------- 81
D. Reddick and L. C. Peterson (N.Y. (Cornell) Agr. Expt. Sta., Ithaca, N.Y.) 85

NORTH CAROLINA
F. D. Cochran, J. H. Jensen, M. E. Gardner, T. L. York (N.C. Agr. Expt. Sta., Raleigh, N.C.)---------- 87

NORTH DAKOTA
W. P. Baird Northern Great Plains Field Sta., Mandan, N. Dak.)---------- 91
Wm. G. Hoyman and Harold Mattson (N. Dak. Agr. Expt. Sta., Fargo, N.Dak.)-- 92
Harold Mattson (N. Dak. Agr. Expt. Sta., Fargo, N. Dak.)---------- 94

OHIO
J. P. Sleesman and John Bushnell (Ohio Agr. Expt. Sta., Wooster, Ohio)----- 98

PENNSYLVANIA
J. Stanley Cobb (Pa. Agr. Expt. Sta., State College, Pa.)---------- 98
W. R. Mills (Pa. Agr. Expt. Sta., State College, Pa.)---------- 102

RHODE ISLAND
T. E. Odland (R. I. Agr. Expt. Sta., Kingston, R. I.)---------- 105

SOUTH CAROLINA
William M. Epps (S. C. Agr. Expt. Sta., Charleston, S. C.)---------- 106

TEXAS
W. H. Friend (Tex. Agr. Expt. Sta., Weslaco, Tex.)---------- 108

VIRGINIA
Flood S. Andrews (Va. Agr. Expt. Sta., Blacksburg, Va.)---------- 109
M. M. Parker (Va. Truck Expt. Sta., Norfolk, Va.)---------- 110

Page

WASHINGTON
Martin W. Carstens (Northwest Agr. Lab., Mt. Vernon, Wash.)---------- 114
Seth B. Locke (Wash. Agr. Expt. Sta., Pullman, Wash.)---------- 117
T. E. Randall (Wash. Agr. Expt. Sta., Pullman, Wash.)---------- 118
C. L. Vincent (Wash. Agr. Expt. Sta., Pullman, Wash.)---------- 119
J. D. Menzies (Wash. Prosser)---------- 121

WEST VIRGINIA
K. C. Westover (W. Va. Agr. Expt. Sta., Morgantown, W. Va.)---------- 129

WISCONSIN
G. H. Rieman (Wis. Agr. Expt. Sta., Madison, Wis.)---------- 131

WYOMING
Wm. A. Riedl, G. H. Starr, and Fred I. Frosheiser (Wyo. Agr. Expt. Sta., Laramie, Wyo.)---------- 134

NATIONAL POTATO-BREEDING PROGRAM, 1947

By F. J. Stevenson

New Varieties

With so many people in the various States working on different phases of the potato-breeding program it is not surprising that many new varieties are being distributed to growers.

In the report of Reddick and Peterson, New York, it is stated that "Descriptions of 4 varieties have been published in the October issue of the American Potato Journal." These were Placid, Virgil, Ashworth, and Chenango. The report also states that "Descriptions of Cortland, Essex, Fillmore, Glenmeer, Harford, Madison, and Snowdrift are nearly completed." These, in addition to Empire, which was described in the American Potato Journal 22: 357-362, makes a total of 12 varieties named and distributed by the Cornell University Experiment Station as the result of the program of breeding potato varieties immune to late blight. None of the 12 are immune but are highly resistant as can be seen in the report.

In the Minnesota report 3 new varieties are indicated: Waseca, Chisago, and Satapa. These are evidently being distributed for market quality. According to the table in the report, Waseca seems to be preferred to Red Warba; Satapa to Chippewa and Pontiac, although it yields about the same, but Chisago does not seem to be much better in any of the tests than Cobbler and Triumph.

The Louisiana report indicates the distribution of another new variety. In 1943 the De Soto and La Salle were introduced and in 1947 La Soda was distributed. La Soda is a cross between Triumph and Katahdin and was first grown in the fall of 1936. (See report for brief description).

Selections That May be Named and Described in the Near Future

In the Colorado report by L. A. Schaal, reference is again made to Colorado Seedling 6317. In 1947 it was tested in a number of places and increased as foundation seed at Yampa. More extensive tests will be made in growers' fields in 1948 and if reports are favorable it may be named and distributed to the industry. U. S. D. A. seedling X 1276-185 (see the Maine report by Donald Folsom), a selection from the cross Houma x Katahdin, has shown for a number of years some resistance to leaf roll in the field tests at Highmoor Farm. In 1947, 3 acres of seed of X 1276-185 was grown by Evan C. Cobb of Lee, Maine. The Maine Potato Seed Board in last reports were also growing some of this seedling as part of their foundation seed, pending decision as to whether or not it is worth their recognition.

Nebraska 3 (USDA 0123 x Minn 41-1-1-7-6-1) is a selection with a dark red tuber. It was increased sufficiently in 1947 to provide seed for an acreage that should produce 35 to 50 carloads of potatoes in 1948, after which it will be named and released or be dropped. Nebraska # 2 is being grown rather extensively also. (See Nebraska report).

B 70-5 will be described and distributed to growers in 1948. This variety is being increased by the Maine Potato Seed Board and from recent reports they seemed to be in favor of introducing it to their growers. This is the first variety to be produced with the resistance to late blight that in 1932 was sent to us in true seed by K. O. Müller of Berlin-Dahlem, Germany. Some of the seedlings produced from this seed were immune to the forms of late blight prevalent in Maine, but none of them showed promise from a commercial standpoint. A series of crosses were made from the best selections on American varieties. A few of the progeny of these crosses approached commercial varieties in their behavior. Some of them were early and had good cooking quality combined with the blight immunity of the selections made from the German seedling, but they lacked somewhat in yield. The best of these were crossed again to high-yielding seedlings and out of this series of crosses, B 70-5 and a number of other high-yielding selections were made.

B 70-5 is a widely adapted seedling as can be seen by a number of the reports. In 1947, 4 cooperative tests were made in Maine. B 70-5 outyielded Green Mountain by more than 70 bushels of U. S. No. 1 tubers per acre. Its specific gravity averaged 1.0780 and that of Green Mountain 1.0839. This would indicate a difference in starch-content of about 1%. The quality of the seedling grown on Aroostook Farm was excellent both baked and boiled. It is not immune to late blight in the field but very highly resistant. Usually a few blight spots will develop on the lower leaves when they begin to mature. The tubers are highly resistant to tuber rot but not immune.

In addition to the new varieties many new combinations of characters have been produced in recent years. One of the outstanding seedlings in the Maine tests in 1947 was B 351-44. This was a selection from 96-44 x 336-144. Both parents show resistance to blight and 336-144 is highly resistant to ring rot. In the Presque Isle tests B 351-44 yielded 564 bushels of U. S. No. 1 tubers per acre as compared with 480 bushels for Green Mountain. It was not quite as high in specific gravity as Green Mountain but high enough to be excellent for baking. It has good type tubers with a tough skin and is medium in maturity. This one will be watched with interest.

Older Varieties

In the Michigan report, Wheeler and Moore say that, "Potato scab in Michigan, on most susceptible varieties, makes deep pitted scab on the tubers. The Sebago variety under similar conditions has scab only on the surface and only slightly raised. Potato growers, who have been irrigating, have high praise for the Sebago because of its high yields of excellent tuber type. In 1948 it will be grown by more growers using irrigation. Growers of Sebago on muck where late blight was present are enthusiastic and will plant more of this variety in 1948."

The New Jersey report showed that the highest yields in the tests were produced by Teton and Katahdin.

The Pennsylvania report by W. R. Mills shows that much interest is shown among growers in the Teton variety. This variety has already been instrumental in reducing the amount of ring rot in Pennsylvania. (See Pa. report by W. R. Mills).

Specific Gravity

It is rather generally accepted that specific gravity is correlated with cooking quality. However, as is well known, there is often a greater difference in specific gravity in the same variety grown in two locations in a State than between varieties grown at the same location. This is well illustrated in the Nebraska report where 16 named and numbered varieties were grown. In the Banner County tests the average specific gravity for all 16 varieties was 1.0860. For the same 16 varieties grown at Lincoln, under irrigation, the mean was 1.0576. All the varieties grown in Banner County would be considered mealy, but only one would make the grade in the Lincoln irrigated plots and that one was right on the border line.

Another illustration of this is shown in P. I. table 11 where the specific gravities for 15 varieties grown at 4 different locations in Maine varied considerably, but not to such an extent as those grown in Nebraska.

A comparison between the Maine potato breeding reports for 1947 and 1946 will show the seasonal variation.

The data on specific gravity in family lines as given in P. I. table 12 are worth noting and should be a help to all potato breeders in planning their crosses.

Scab Resistance

More work is being done on breeding for scab resistance in the National Potato-Breeding Program than on any other project except yield, market and cooking quality.

The Wisconsin report brings out the difficulties that have been encountered in this work; difficulties that all of us who have attacked this problem have met with.

The scab-resistant varieties from Europe are all late maturing. The lateness in these varieties behaves as a dominant. To get late scab-resistant varieties is not difficult but early scab-resistant sorts are few and far between. A few medium-early and early seedlings that have various degrees of scab resistance have now been produced and the work should proceed faster in the future. Another complication in this project, as in many if not all other disease resistance problems, is the existence of many physiologic races of the organism that causes scab. The following is an illustration of what happens. The seedling B 61-3 shows a high degree of resistance to scab in the tests in Maine and a selfed line segregated for resistance. However, at the Shafter Station, Calif., in 1947, it showed complete susceptibility. Colorado seedling 6316 was also completely susceptible. (See Calif. table 4).

Ring Rot Resistance

Ring rot resistance has been combined with resistance to late blight and other characters.

The percentage of seedlings that survived the inoculations without contracting ring rot was somewhat smaller in 1947 than in previous years. The number of resistant seedlings with good tuber type and other desirable marketing qualities was greatly increased. Teton was again free from ring rot. Erie, a sib of Teton, showed 40% ring rot. In contrast to these, Katahdin, Earlaine, and several other varieties were 100 % infected. (See Maine, Reiner Bonde).

Results of tests with ring rot inoculum from various varieties did not substantiate the common belief that inoculum from resistant varieties is more virulent than inoculum from susceptible varieties. (See Wyoming report by Riedl, Starr, and Frosheiser).

PLANT INDUSTRY STATION (Beltsville, Md.) and
CHAPMAN AND AROOSTOOK FARMS (Presque Isle, Maine)

By F. J. Stevenson, R. V. Akeley, and E. S. Schultz

Plant Industry Station

The potato-breeding work at the Plant Industry Station consisted of distributing potato seed, seedlings, and varieties to cooperating State agricultural experiment stations and to foreign countries; producing seed of new crosses and selfed lines; growing seedlings in the greenhouse; assembling and analyzing data; summarizing the reports sent in; and sending the summary to all cooperating agencies and to a few others who are particularly interested in the project.

Seed Production

Conditions for seed production in the greenhouse at Beltsville were very favorable in the winter and early spring of 1947, as is indicated by seed having been obtained from both Sebago and Chippewa selfed.

There have been a number of inquiries about techniques. The best temperatures seem to be 50° to 55° F. during the night and 55° to 60° during the day. The humidity must be kept high. This is done by spreading sphagnum moss under the benches and keeping it wet at all times. Common 100-watt lamps are used for supplemental lights. Fluorescent lights will give the most normal plants with few clusters of flowers; the common lights will cause the plants to grow tall--often 6 or 7 feet. Such plants produce many more flower clusters than plants grown under fluorescent lights. As many as 7 clusters of seed balls have been produced on one plant. Artificial lights will supplement sunshine but is not a good substitute for it. The best results are obtained in sunshiny weather. On dark days the lights are kept burning throughout the day until 11:00 p.m. On bright days they are turned on at 4:30 p.m. and cut off at 11:00 p.m. All seed is produced by hand pollination. A very few fruits have ever been found naturally pollinated.

New Seedlings

About 40,000 seedlings were grown in 3-inch pots in the greenhouse at Beltsville in 1947. These will be distributed to various cooperators for the tests that they are especially interested in. These seedlings represented 126 crosses and 30 selfed lines. The characters involved in these crosses and selfed lines are maturity, yield, depth of eye, tuber shape, adaptability, dry-matter content, russet skin, and resistance to viruses A, X and Y, leaf roll, late blight, scab, ring rot, hopperburn, and aphid injury. Self-fertile parents that carry these characters are now available so that the production of any new combination is simplified.

Distribution

The distribution of seed, new seedlings, seedling varieties, and varieties for 1947 are given in P. I. tables 1 to 4. Most of the lots are distributed from Beltsville; the others from Presque Isle, Maine. Potato seed was sent to 5 States, one Territory, and two foreign countries.

P. I. table 1. Distribution of potato seed to State experiment stations and to foreign countries.

Station	Cooperator	Pedigrees	Estimated seeds
		No.	No.
California	N. J. Giddings	5	---
Iowa	C. E. Peterson	10	---
Louisiana	T. P. Dykstra	33	34,700
Virginia	M. M. Parker	20	12,000
Netherlands	H. J. VanKretschmar	7	---
Palestine	J. Ettinger	7	---
Puerto Rico	Arturo Roque	9	7,200
West Virginia	John R. Vaughn	14	---

In all 26,443 seedlings, representing 208 progenies, grown in the greenhouse at Beltsville, were sent to 8 experiment stations.

P. I. table 2. Distribution of new seedlings from greenhouse at Beltsville, Md.

Station	Cooperator	Progenies	Seedlings	Kind of test; resistance to
		No.	No.	
Iowa	C. E. Peterson	24	3,260	Scab and late blight
Louisiana	T. P. Dykstra	42	3,620	Virus, scab & early bligh
North Carolina	M. E. Gardner	41	2,845	Brown rot
North Dakota	W. G. Hoyman	17	2,306	Scab
Ohio	J. P. Sleesman	27	3,621	Hopperburn
Maine	G. W. Simpson	37	8,313	Leaf roll
Maine	Donald Folsom	2	465	Leaf roll
West Virginia	John R. Vaughn	18	2,478	Scab, etc.
Total		208	26,443	

In addition, 21,230 were sent to the Chapman Farm in Maine for increase. A total of 1,400 lots of named and numbered varieties were sent to 37 State experiment stations for yield and other tests.

P. I. table 3. Distribution of seedling selections and varieties to States.

Station	Cooperator	Varieties or seedlings
		No.
Alabama	C. L. Isbell	4
Alabama	Frank A. Garrett	22
Alaska	L. F. Funk	33
Arizona	A. L. Harrison	19
Arizona	A. H. Finch	14
California	Glen N. Davis	30
Connecticut	L. C. Curtis	13
Florida	James C. Hoffman	24
Florida	W. D. Wylie	14
Florida	A. H. Eddins	17
Idaho	John L. Toevs	71
Indiana	N. K. Ellis	71
Iowa	C. E. Peterson	24
Iowa	E. S. Haber	6
Louisiana	T. P. Dykstra	29
Maine	C. A. Brautlecht	36
Maryland	R. A. Jehle	4
Michigan	E. J. Wheeler	139
Minnesota	M. J. Thompson	15
Nebraska	H. O. Werner	23
New York	W. F. Mai	8
North Dakota	W. G. Hoyman	109
North Dakota	Harold Mattson	71
Ohio	J. P. Sleesman	42
Pennsylvania	R. E. Hartman	30
Pennsylvania	J. S. Cobb	14

P. I. table 3 cont'd.

Station	Cooperator	Varieties or seedlings
		No.
Pennsylvania	B. F. Coon	71
Rhode Island	A. E. Rich	20
South Carolina	W. M. Epps	28
Texas	W. H. Friend	24
Utah	E. L. Waldee	14
Virginia	Flood S. Andrews	7
Virginia	M. M. Parker	74
Washington	C. L. Vincent	10
Washington	H. P. Singleton	125
Washington	W. W. Carstens	71
West Virginia	John R. Vaughn	74
Total		1400

264 lots were sent to foreign countries.

P. I. table 4. Distribution of old seedlings and varieties to foreign countries.

Country	Cooperator	Varieties or seedlings
		No.
Union of South Africa	L. J. Henning	29
Netherlands	H. J. van Kretschmar	10
Brazil	Jose Deslandes	79
Canada	Orvil A. Olsen	10
Central America	William C. Davis	8
Italy	Luigi Fenaroli	23
New Zealand	A. G. Sainsbury	5
Poland	Stanislaw Jasnowski	21
Uruguay	Carlos J. Berta	3
Spain	Ramon Sala Roqueta	21
Sweden	Hugo Oswald	21
Netherlands	A. Groothoff	4
Yugoslavia	Franjo Yanezic	30
Total		264

Chapman Farm, Maine

An increase plot of approximately five-sevenths of an acre was grown on the Chapman Farm in 1947. Twenty-two seedlings that have appeared promising either in Maine or other States in the past have been increased beyond the 10-hill

status since a larger quantity of seed of each was needed for further tests. At early harvest 181.5 bushels were stored. Later in the fall 108 bushels from these 22 seedlings were graded and shipped to Beltsville, Md., for distribution. A few of these, such as B 70-5 and B 76-43, look very promising.

The first-year seedling crop planted at Chapman in 1947 totaled 21,230 seedlings. These single-hill seedlings came from the greenhouses at Beltsville. Due to a wet June only 92.6 percent or 19,661 germinated. Of those that did grow 10.6 percent or 2,086 were selected for replanting next year at Chapman and testing for various disease reactions; 755 will be tested for reaction to late blight in the vines and tubers; 658 for scab; 665 for ring rot; 459 for net necrosis due to leaf roll virus; 471 to virus X; 181 for virus A; and 23 for virus Y.

Of seedlings selected in past years for their resistance to one or more diseases 2,779 were grown in multiple 10-hill rows. Maturity notes were taken on 2,495 of these: 12.7 percent were early, 42.8 percent medium, and 44.5 percent late. Data for maturity and fertility are given in Plant Industry table 5. Fertility data were also taken on 2,472 of these selections: 66.2 percent not fertile, 4.2 percent slightly fertile, 7.0 percent medium fertile, and 22.6 percent highly fertile. In 1946 nearly 92 percent of the seedlings at Chapman were sterile but in 1947 only 62 percent were sterile. This difference is probably due to environmental factors and the introduction of newer seedlings of the fertile sort. Virus disease readings were taken on these 10-hill seedlings and roguing the diseased ones was accomplished. The amount of virus diseases present was less than 1 percent. At late harvest time many desirable parents and seedlings for distribution to cooperators were saved.

P. I. table 5. Maturity and fertility data taken on the seedling varieties grown in multiple 10-hill rows at Chapman in 1947.

Maturity	Seedlings	Percent	Fertility	Seedlings	Percent
	No.			No.	
Early	316	12.7	None	1,636	66.2
Medium	1,069	42.8	Slight	104	4.2
Late	1,110	44.5	Medium	174	7.0
			Good	558	22.6
	2,495	100.0		2,472	100.0

The data for yield and specific gravity for a group of early and medium-early varieties are given in P. I. table 6. If the least significant difference is considered it will be seen that only Mesaba and Triumph yielded significantly less than Irish Cobbler. C. S. 6317 was the highest yielder in the group but it was not significantly higher than Irish Cobbler.

Specific gravities were all comparatively low this year. If 1.080 is taken as the lower limit for a mealy potato only 5 of these varieties exceeded the limit.

P. I. table 6. Yield, percentage of U. S. No. 1, and specific gravity readings of 15 named or numbered early or medium-early varieties and seedlings at Aroostook Farm, Presque Isle, Maine, in 1947.

Variety	Yield U.S. No. 1 1/ tubers per acre	Yield U.S. No. 1	Specific gravity 2/
	Bu.	Percent	
Irish Cobbler	489	96	1.0862
La Salle	519	98	1.0822
C. S. 3175	460	97	1.0700
Mesaba	384	95	1.0820
Earlaine	492	98	1.0690
DeSoto	460	92	1.0760
Red Warba	442	98	1.0781
1276-185	496	98	1.0781
K-5	519	94	1.0704
SCIA 27	514	97	1.0761
C.S. 3412	481	96	1.0865
Pawnee	460	97	1.0738
Triumph	414	96	1.0708
C.S. 6317	538	98	1.0825
96-44	481	99	1.0775
L.S.D.	51.9		

1/ Mean of 6 replications of 25-hill rows grown in randomized blocks.
2/ Mean of samples from each of three replications of the yield test.

The data for yield, percentage of U. S. No. 1 tubers, and specific gravity of 25 late or medium-late varieties at Aroostcok Farm, Presque Isle, Maine, in 1947, are given in P. I. table 7.

Green Mountain ranked first in yield and specific gravity. Again the specific gravity readings of all varieties were low. In 1946 Green Mountain tubers had a specific gravity reading of 1.099; in 1947, 1.0879. In 1946 Mohawk had a specific gravity of 1.103, but only 1.0866 in 1947.

Ontario outyielded the other three scab-resistant varieties Seneca, Cayuga, and Menominee. Teton outyielded its sib, Erie, by 17 bushels but this was not a significant difference.

P. I. table 7. Yield, percentage of U. S. No. 1, and specific gravity of 25 named or numbered late or medium-late varieties of potatoes at Aroostook Farm, Presque Isle, Maine, in 1947.

Variety	Yield of U. S. No. 1 tubers per acre 1/		Specific gravity 2/
	Bu.	Percent	
Empire	404	98	1.0819
Seneca	467	97	1.0785
Norkota	505	96	1.0808
Erie	511	97	1.0772
Milan	588	97	1.0828
Houma	453	94	1.0774
Green Mountain	606	98	1.0879
Sebago	470	96	1.0775
Cayuga	439	96	1.0833
Calrose	438	94	1.0755
Marygold	553	99	1.0770
Ontario	526	98	1.0741
Mohawk	471	98	1.0866
Kasota	470	95	1.0759
Teton	565	99	1.0791
Menominee	439	98	1.0818
Chippewa	528	97	1.0724
Katahdin	457	98	1.0786
Pontiac	559	99	1.0726
Potomac	440	94	1.0800
Sequoia	508	98	1.0786
336-144	503	93	1.0804
792-94	387	83	1.0853
792-133	514	95	1.0811
FBY-4	373	95	1.0786
L.S.D.	35.1		

1/ Mean of six replications of 25-hill rows grown in randomized blocks.
2/ Mean of samples from each of three replications of the yield test.

Plant Industry table 8 gives the yield and specific gravity reading of early and medium-early selections from the newer seedlings grown on the Chapman Farm in comparison with Chippewa, Irish Cobbler, and Warba.

Chippewa was the highest yielded in this group but not significantly higher than B 355-9 and B 355-24. B 355-24 is resistant to blight and ring rot; one of the first to combine these two characters in a near commercial variety.

P. I. table 8. Yield, percentage of U.S. No. 1, and specific gravity readings of early and medium-early selections from the Chapman Farm in comparison with Chippewa, Irish Cobbler, and Warba.

Variety	Yield of U. S. No. 1 tubers per acre 1/		Specific Gravity 2/
	Bu.	Percent	
Chippewa	506	96	1.0739
Irish Cobbler	470	97	1.0847
Warba	427	97	1.0813
B 71-4	396	98	1.0786
B 355-9	495	94	1.0859
B 355-24	480	98	1.0767
B 402-1	342	93	1.0748
B 445-38	442	92	1.0759
B 608-23	432	99	1.0622
B 608-25	396	97	1.0640
B 608-66	454	99	1.0615
B 608-71	337	98	1.0595
B 616-99	460	98	1.0729
B 638-11	386	97	1.0641
L.S.D.	34.8		

1/ Mean of 3 replications of 25-hill rows grown in randomized blocks.
2/ Mean of samples from each of three replications of the yield test.

Yield, percentage of U. S. No. 1 tubers, and specific gravity readings of late and medium-late selections from the Chapman Farm in comparison with Katahdin, Chippewa, and Green Mountain are given in Plant Industry table 9.

One of the outstanding seedlings in this test is B 351-44. It is medium in maturity and produces good type tubers with a tough skin. It had a specific gravity of 1.0858 which is comparatively high for this season. It yielded 84 bushels per acre more than Green Mountain. It is highly resistant to both late blight and ring rot. It is a selection from a cross of 96-44 x 336-144. It gets its resistance to blight from 96-44 and to ring rot from 336-144. This is one of the first seedlings with commercial promise and combining resistance to these two diseases that has so far been produced. If it continues to be outstanding it may find a place for itself among commercial varieties. B 69-16 has been a high-yielding, blight-resistant seedling but it produced rough tubers with many growth cracks in 1947. The seasonal conditions seemed very unfavorable for ideal tuber shape. B 616-99 looked good but a sib, B 616-100, produced poor-type cracked tubers. B 439-91 produced good-type tubers with a tough skin.

P. I. table 9. Yield, percentage of U.S. No. 1, and specific gravity readings of late selections from the Chapman Farm in comparison with Katahdin, Chippewa and Green Mountain.

Variety	Yield of U.S. No. 1 tubers per acre 1/		Specific Gravity 2/
	Bu.	Percent	
Katahdin	495	99	1.0808
Chippewa	511	97	1.0707
Green Mountain	480	96	1.0915
B 61-3	495	97	1.0844
B 69-16	509	97	1.0815
B 69-24	543	98	1.0759
B 70-5	523	97	1.0817
B 76-43	523	99	1.0863
B 282-41	518	98	1.0857
B 320-26	523	98	1.0771
B 351-44	564	96	1.0858
B 355-35	571	94	1.0834
B 355-44	473	97	1.0886
B 395-8	367	94	1.0728
B 395-13	466	95	1.0714
B 434-40	460	97	1.0720
B 434-91	571	98	1.0845
B 446-8	495	97	1.0760
B 480-11	490	94	1.0793
B 608-81	511	99	1.0663
B 616-100	492	99	1.0807
B 675-6	516	98	1.0841
L.S.D.	88		

1/ Mean of 3 replications of 25-hill rows grown in randomized blocks.
2/ Mean of samples from each of 3 replications of the yield test.

Dr. J. P. Sleesman of the Ohio Agricultural Experiment Station, Wooster, Ohio, who has been testing seedlings for their resistance to insect injury and other characters, selected a number of the more promising sorts and asked to have them increased in Maine. Of these, seven were tested for yield. Plant Industry table 10 gives the yield and specific gravity data for the 7 selections in comparison with B 61-3 and B 70-5. B 478-1 was the most resistant to hopperburn. (See Ohio Report.) This is a selection from the cross Sequoia x 96-56. It was highly resistant to blight in the tests in Maine. It evidently inherited its resistance to hopperburn from Sequoia and its blight resistance from 96-56.

P. I. table 10. Data on yield and specific gravity of seedlings increased in Maine for J. P. Sleesman, Wooster, Ohio. B 61-3 and B 70-5 were planted for comparison.

Variety	Yield of U.S. No. 1 tubers per acre		Specific Gravity
	Bu	Percent	
B 61-3	451	96	1.0839
B 70-5	576	99	1.0782
B 269-20-37	429	97	1.0750
B 269-20-56	542	95	1.0753
B 280-2-41	393	95	1.0749
B 313-10-55	335	97	1.0857
B 478-1	401	97	1.0704
B 493-3	451	95	1.0730
B 504-3	545	97	1.0743
L.S.D.	54.3		

Late Blight Resistance

Sixteen family lines, totaling 615 seedlings, and 13 parents were tested in 1947 for late blight resistance in the vines and tubers. Their foliage was tested in the field by spraying spores on the green plants. Their tubers, 5 from each seedling, were harvested the latter part of August and soon after sprayed with spores and put into a dark moist bin in the potato house at an optimum temperature for 2 weeks in order to induce the late blight rot. The Green Mountain checks in the field test were practically killed with only a few apical leaves and green stalks left at the time the readings were taken. The President was not much better. Of the 615 seedlings tested, 272 or over 44 percent were free from any blight infection. The resistant parents, X96-44, X96-56, B 61-3, B 192-17, and B 287-2, again showed no late blight lesions but Sebago appeared to be only a little better than Green Mountain and President. Most of those that had no blight on the vines when the data were taken developed small pustules on the lower leaves very late in the season. The infection occurred when the leaves began to mature but the crop of tubers had been made already.

In the tuber blight test 608 of the above-mentioned seedlings were tested. Of these 136 or 22 percent showed no infection and 42 or about 7 percent had only a trace of tuber rot. The 3 Green Mountain checks all showed late blight rot; one had 3 out of 5 tubers diseased, and 2 had all 5 tubers infected. The 3 intact President checks were a little better for resistance than the 3 which were bruised before inoculation by spores. The parents X 96-56 and B 287-2, were the only two that were free from tuber blight. Sebago had a trace showing. Many more seedlings might have indicated greater resistance to tuber blight if special care had been taken in hand-digging the material, but the general idea was to handle the seedlings in a normal manner and to see what would happen.

Scab Test

Three hundred twenty-seven selections, representing 7 progenies, 8 parents, and 27 Nebraska seedlings were included in these tests. Over 80 percent of the Green Mountain checks had 50 percent or more of their surface covered with type 3 pustules. The 327 from the progenies tested showed 18 with only a trace of their surface covered and 169 with a mean coverage of 10 percent. Taking these two classes as the resistant ones, over 57 percent indicate some scab resistance as far as surface area is concerned. Again, assuming the first two classes for type of pustule are the resistant ones, 18 of the 327 occurred in type 1 and 84 in type 2 which shows that at least 31 percent are good in resistance to scab on a pustule basis. The parents Menominee and B 61-3 still show good resistance. B 402-1 and X 499-b were both as resistant to scab as Hindenburg this year. The Nebraska seedlings showed very little resistance.

COOPERATIVE YIELD TESTS IN MAINE, 1947

W. C. Libby and R. V. Akeley

This season 8 varieties and 6 seedlings were tested for yield and specific gravity at Van Buren, Presque Isle, Patten, and Old Town, Maine. With the exception of Old Town, the potatoes were planted 12 inches apart in the row with 34 inches between the rows. Ten replications of each variety, consisting of 25 hills each, were used. At Old Town the seed was placed 12 inches apart in 36-inch rows, and only 8 replications were harvested. The experimental results are given in P. I. table 11.

The yields in general were very good this year in Maine. The blight-resistant seedling B 70-5 was the highest yielder in all locations, and its quality was a little lower than the Green Mountain or Mohawk. Seedling B 69-16, another blight-resistant seedling, was also one of the best yielders in the tests and compares with B 70-5 in quality. Seedling B 61-3 has some scab resistance and good late blight resistance. It compares very favorably with Irish Cobbler in yield and specific gravity. North Dakota Seedling NDK-5 was very low in quality but compares favorably with Chippewa in yield. The leaf roll resistant seedling 1276-185 was a little better than Chippewa in quality but lower in yield. Seedling 46952 is an early, ring rot resistant sort, but its yield and dry-matter content are about as low as they could be. This seedling could well be dropped from future tests. Teton, a late-maturing ring rot resistant variety, compares with Green Mountain in yield and with Katahdin in quality. Ontario, a new scab-resistant introduction, was better than Katahdin in yield but about the same in quality (PI table 11). *

* See table on page 15.

P.I. table 11. POTATO VARIETY COOPERATIVE YIELD TRIALS* - 1947
MAINE

VARIETY	VAN BUREN		PRESQUE ISLE		PATTEN		OLD TOWN		AVERAGE	
	Specific Gravity**	Yield per acre	Specific Gravity**	Yield per acre	Specific Gravity**	Yield per acre	Specific Gravity**	Yield per acre	Specific Gravity	Yield per acre
		Bushels		Bushels		Bushels		Bushels		
B70-5	1.0726	664.2	1.0824	593.0	1.0743	821.6	1.0828	619.2	1.0780	674.5
Green Mountain	1.0772	656.7	1.0909	565.1	1.0785	603.6	1.0892	585.1	1.0839	602.6
Teton	1.0706	652.1	1.0805	567.2	1.0693	669.6	1.0787	529.4	1.0748	604.6
Ontario	1.0671	615.7	1.0777	548.9	1.0683	665.9	1.0771	452.1	1.0725	570.6
B69-16	1.0755	584.3	1.0838	519.5	1.0741	800.0	1.0860	505.3	1.0798	602.3
N.D. K-5	1.0629	576.0	1.0699	574.0	1.0610	688.7	1.0724	484.8	1.0665	580.9
Chippewa	1.0649	570.2	1.0728	572.0	1.0664	596.3	1.0728	495.3	1.0692	558.4
Mohawk	1.0782	540.3	1.0862	491.1	1.0789	598.8	1.0892	539.2	1.0831	542.3
Katahdin	1.0726	537.8	1.0705	510.5	1.0687	582.7	1.0786	451.2	1.0726	520.5
Irish Cobbler	1.0754	529.8	1.0837	534.7	1.0757	619.6	1.0803	469.8	1.0788	538.5
B61-3	1.0752	528.1	1.0837	511.0	1.0776	678.8	1.0860	558.4	1.0806	569.1
1276-185	1.0716	511.3	1.0760	479.0	1.0662	492.2	1.0765	428.0	1.0726	477.6
Sebago	1.0702	502.1	1.0790	471.7	1.0712	533.3	1.0796	503.3	1.0750	502.6
46952	1.0597	348.7	1.0637	351.4	1.0594	521.8	1.0680	383.5	1.0627	401.3
N.D. 2-23	-	-	1.0752	506.4	-	-	-	-		
Least Significant Difference	1.0710	558.4	1.0786	520.6	1.0707	633.8	1.0798	500.3	1.0750	553.3
1% Level	.0049	67.3	.0028	51.8	.0041	114.4	-	87.2		
5% Level	.0037	50.9	.0021	39.2	.0031	86.6	-	65.8		

*With the exception of the plot in Old Town, the potatoes were planted twelve inches apart in the row with thirty-four inches between rows. Ten replications each consisting of twenty-five hills. At Old Town the seed was twelve inches apart in the row with thirty-six inches between rows. Eight replications of twenty five hills each were harvested at Old Town.

**Specific gravity of 1.078 equivalent to about 13.5% starch. An increase in Specific Gravity of .005 equal to starch increase of about 1%.

SPECIFIC GRAVITY IN FAMILY LINES

R. V. Akeley and F. J. Stevenson

During the fall of 1947, 555 seedlings from 10 progenies were harvested at Chapman, Maine, for specific gravity tests. P. I. table 12* shows the variation between the family lines and the clonal parents. The differences between the high specific gravity crosses and the low ones are self evident. The progeny B 1130 or B 61-3 selfed was the highest of the selfed lines and reacted well as a parent in crosses. These same families were planted in a leaf roll exposure plot and will be examined for net necrosis in the tubers later in the season. It will be of interest and also value to know if high specific gravity and susceptibility to net necrosis are correlated.

Increase and Maintenance of Genetic Material

Potato genes can be carried either in seed or tuber stock. Seed can be stored for a number of years without loosing its viability. Tuber stocks must be grown every year.

The USDA maintains in storage a considerable amount of seed which is sent to anyone who can make use of it. The maintenance of tuber stocks is not so simple. Many new varieties and species are introduced from foreign countries and many others are being produced in the breeding operations. A number of these carry valuable genes, but it is next to impossible to keep all of them free from the viruses even when careful roguing and early harvesting are practiced. Consequently over the years many stocks are discarded.

However, in spite of the difficulties, a valuable collection of varieties and seedlings is being maintained by the USDA on the Aroostook Farm, Presque Isle, Maine. The size of the plots vary from 10 to 2,000 hills according to the anticipated demand. A large number of the old varieties are maintained in 60-hill rows. The list includes 26 old American varieties, among which are Garnet, Chili, Blue Victor, and several others that are no longer in commercial production; 31 new varieties and 33 European varieties. In the latter group are found Ackersegen, Parnassia, Starkeragis, and Ostbote, and several other so-called high-starch varieties. Triumf, Friso, Noordeling, and Skerry Champion, resistant to leaf roll; Rheingold, Arnica, Hindenburg and Richter's Jubel, resistant to scab; Flava, Robusta, Prisca and Starkeragis, resistant to black leg.

In addition to the named varieties, numbered varieties are being maintained that have:

1. Immunity in the field to virus A.
2. Immunity in grafts to virus X.
3. 1 and 2 combined.
4. Resistance to virus Y.
5. Immunity to common forms of late blight.

* See table on page 17.

Plant Industry Table No. 12 Specific Gravity Data on 10 Progenies grown at Chapman in 1947

Pedigree Number	Parentage	Specific Gravity Classes: 1.051 to 1.053	1.056 to 1.058	1.061 to 1.063	1.066 to 1.068	1.071 to 1.073	1.076 to 1.078	1.081 to 1.083	1.086 to 1.088	1.091 to 1.093	1.096 to 1.098	1.101 to 1.103	Total	Means and standard errors	
B590	Green Mt. x B61-3			1	1	3	9	8	4	2			28	1.0805+	.0069
B591	Mohawk x B61-3					15	10	22	7	4	1		59	1.0811+	.0064
B592	I. Cobbler x B61-3				3	7	15	17	19	10	3	1	75	1.0839+	.0076
B607	B83-9 x Teton		5	11	22	30	16	6	1				91	1.0715+	.0065
B614	Katahdin x Teton		1	8	9	7	8	6					39	1.0720+	.0073
B637	Green Mt. x Teton				1	4	12	2	2				21	1.0780+	.0051
B1121	B83-9 selfed	3	6	12	8	2							31	1.0630+	.0053
B1123	Teton selfed		4	7	28	30	21	6	2				98	1.0722+	.0062
B1127	Katahdin selfed		1	5	9	18	19	17	4		1		74	1.0762+	.0073
B1130	B61-3 selfed				3	8	10	10	6	2			39	1.0798+	.0066
	Totals	3	17	44	84	124	120	94	45	18	5	1	555		
	Clonal parents														
	Green Mountain							1	7	8			16	1.0902+	.0032
	Mohawk							4	9				13	1.0865+	.0024
	Irish Cobbler						3	8	4	1			16	1.0839+	.0042
	Katahdin						8	8					16	1.0805+	.0026
	Teton						7	6					13	1.0803+	.0026
	B61-3						2	9	5				16	1.0839+	.0032
	B83-9												0	0	

6. Resistance to scab.
7. 4 and 5 combined.
8. Resistance to ring rot.
9. Resistance to late blight and ring rot.
10. Resistance to leaf roll.
11. Resistance to aphid injury.
12. Resistance to hopperburn.

U.S.D.A. SOUTHERN STATES PROJECT
(Louisiana Headquarters)
T. P. Dykstra

Theodore Dykstra

Objectives: The object of the Southern Potato Project is to develop varieties of potatoes suitable to the South and resistant to diseases prevalent in this region.

The needs of the cooperating States vary somewhat. Some of the States place special emphasis on the desirability of an early rosy red skinned potato, whereas some of the other States have developed a market for white-skinned varieties.

Resistance to such diseases as early blight, late blight, southern stem blight, and scab is also greatly needed. The importance of each one of these diseases varies according to locality.

During the last few years late blight has become a much more serious disease in the South than it was formerly. This is especially true in Louisiana. In many of the Southern States a spring and a fall crop are grown, and the late blight organism can easily live over from one growing season to the next. For this reason major attention will be given to the development of late blight resistance in our seedlings.

In Mississippi and in certain sections of Florida southern stem blight caused by Sclerotium rolfsii is one of the most important diseases confronting the potato industry.

Early blight and scab are also of major importance in some sections of the South.

Since practically all the seed potatoes used in the South are grown in the Northern States, promising seedlings well adapted to the South are sent to Northern States to determine whether these are also adapted to that region. If a variety cannot be grown profitably in the North, seed potato growers are not interested in propagating it, and regardless of its adaptability to the South such a variety is practically useless.

Most of the experimental studies are conducted in Baton Rouge, La. Crosses are made in the greenhouse, where true seed is also planted and seedlings are transplanted in pots. Yield plots and plots to test seedling varieties for

resistance to scab, late blight, early blight, and leafroll are also maintained here. It is planned to have in the future experimental plots on late blight in the important potato-growing parishes of LaFouche and Terrabonne. In cooperation with the University of Tennessee, we are using some of the land of the Plateau Branch Experiment Station, located at Crossville, Tenn., to increase all our seedlings, and to maintain our foundation seedstock of seedling and commercial varieties. About 10,000 seedlings are increased each year. These are obtained from crosses made in Louisiana, and several promising seedlings are also obtained annually from Dr. F. J. Stevenson. (USDA, Beltsville, Md.) The selections are increased, and the following year the best seedlings are used to test in the disease resistance plots in Louisiana. The next year, samples are sent to co-operating States in the South for further tests. Reports on performance of these are obtained prior to harvesting in Tennessee, and the desirable seedlings are maintained for further increase and additional tests. Except for yield plots, we have not conducted any other experimental studies at this station.

Disease resistance plots: Formerly there was a tendency to use a large number of seedlings in plots used to study potato disease resistance. This was necessary since little was known about the genetic make-up of the parents, and it served as a means to determine which varieties used as parents carried one or more factors for resistance to a disease. During the last 10 years considerable progress has been made in learning more about the genetic constitution of different varieties used in making crosses. It seems like a waste of time to include a large number of seedlings in a plot used for testing scab resistance, late blight resistance, etc., when it is definitely known that none of the parents used in making these crosses, carry factors for resistance to these diseases.

Our tendency is now to use in the disease resistance plots primarily those seedlings that are obtained from crosses where at least one of its parents carries resistance to the particular disease tested. This decreases the quantity of material used, but increases the quality of the varieties that are maintained.

Early Blight: On account of climatic conditions, the infection of early blight was not as severe and uniform in the plot this year as last year, but a fair amount of No. 3 and No. 4 types of infection were found in the controls and susceptible seedling varieties. So far we have not as yet found any immune seedlings, but a high degree of resistance characterized by No. 1 lesions was found in 50% of the 226 seedling varieties tested. Seedling B 70-5, which is highly resistant to late blight, did not develop any appreciable early blight infection until it approached maturity, when considerable infection became evident. If this should be characteristic of this seedling in other localities, it might be classified as also quite resistant to early blight, since infection occurring only at maturity would not appreciably affect the yield.

Late Blight: This year was the first time that seedlings have been tested for late blight resistance in the plots at Baton Rouge. The same seedlings as used in the early blight plot were tested. Considerable infection took place, and the results were most encouraging. Whereas the susceptible varieties were practically killed, several seedlings that have shown considerable resistance to early blight were also highly resistant to late blight. This was especially true of the seedlings that had 96-56 or some other late-blight-resistant variety as one of its parents.

Scab: Seedlings that were most apt to show scab resistance were planted in the scab plot. This plot has been inoculated each year for 8 years and is heavily infested with the scab organism. Susceptible varieties and the Green Mountain controls generally show the No. 4 type scab lesion, and 40 to 80% of the tuber surface is covered with pustules. Of the 144 seedling varieties tested, 9% showed 1/20 type lesion or better.

Leafroll: Several seedling varieties were tested for resistance to leafroll by planting every other row with leafroll infected Chippewa. Since these studies were initiated this year, results on resistance will not be available till next year.

Southern Stem Blight: These important studies are conducted by Professor W. S. Anderson and Dr. Presley at Mississippi State College. Although none of the seedlings tested are immune, a considerable number have shown a high degree of resistance. The promising seedlings are increased for additional testing at the Plateau Experiment Station in Tennessee, and are also used in making crosses to combine Southern Stem Blight resistance with other desirable characters.

U.S.D.A. Potato Field Station (Greeley, Colo.)
COLORADO
W. C. Edmundson

The seedling investigational work for the year 1947 consisted of breeding and testing for scab resistance, for better shipping quality, and for earliness of both white and red potatoes.

In addition to test plots at the Station, seedlings were grown in 2 test plots at Easton and Ault, the early-potato district at Gilcrest, Colo. Seedlings developed at the Station were also tested in Maine, Miss., Tenn., Wyo., Wash., Idaho, Oreg., and Ariz., for both the early and late crop. Tests were also conducted at the Colorado branch stations at Monte Vista, San Luis Valley, and Rocky Ford.

Because of rains in June, planting was delayed a week to 10 days. A frost on September 14, 1947, killed about half of the foliage, reducing the yield of the late-maturing seedlings. Early blight appeared the last of August, but no late blight was noted in the plots this year. During the season, all plots were sprayed 4 times with DDT and Dithane.

Of the 1946 seedlings, 756 were grown in 5-hill lots. Of these 618 were from crosses made for scab resistance. A large number of these appeared promising at time of harvest and were retained for further test. Among the seedlings selected for testing in 1948 are some promising early white and red scab-resistant ones. Their value cannot be determined, however, until they have been thoroughly tested in the scab test plots. All lots that were saved will be planted in 32-hill lots on a tuber-unit basis.

Of the older seedlings, 154 were planted in 32-hill lots on a tuber-unit basis. A large number of these produced large yields of good-type tubers, making it difficult to determine which ones should be discarded. All lots were retained at harvest for closer study. All these lots have been carefully examined, and the best ones retained for planting in 1948. Of the older seedlings, 21 were planted on a field basis, in rows 540 feet long. These were also planted on a tuber-unit basis.

Of the older and more promising seedlings 12, together with Triumph and Pawnee, were included in a yield test plot. The plots consisted of 25 hills randomized and replicated 5 times. There was not a great variation in yield of the seedlings and varieties. Seedling 4887 produced the largest yield. The mean yield per plot of tubers above 1 7/8 inches was 56 pounds. Seedling 4471 produced 55.9 pounds. Other seedlings produced only slightly lower yields. Seedling 5218 produced the lowest yield, with 40.6 pounds.

Two dark red seedlings that have consistently produced large yields of good type tubers will probably have to be discarded because of red streaks or red tinge of the flesh. Many dark red seedlings have been discarded in the past because of yellow or red flesh.

Six scab-resistant seedlings were included in the yield test in 1947. Of the scab-resistant seedlings 6317 and 5244 are the most promising at the Station owing to the high percentage of No. 1 tubers they produce. Seedling 6317 appears to be the most promising of the scab-resistant seedlings in most sections of the State, but growth-cracks badly at the Station.

Seed from 64 crosses were obtained in the greenhouse last winter. Plantings were made in sand the first week in Jan. After the tubers had sprouted and were well rooted, they were set in the soil on the greenhouse benches. The plants began to blossom about March 1 and continued to blossom until in May. A large amount of seed was developed. Most of the crosses made were for scab resistance, a special effort being made to secure earliness in both white and reds.

Seed for the 1948 seedlings was planted in the greenhouse July 15 and 16, and the plants were potted about a month later. All seed that was planted this year was one year old. Old seed was planted to secure a more even germination. Seed produced only a few months before planting has always germinated unevenly, and small potted plants generally produce smaller tubers. The tubers produced in the greenhouse this fall were mostly all of good size.

U.S.D.A. Colorado (Ft. Collins)
L. A. Schaal

This report is a summary of work on the breeding and testing of new varieties of potatoes for resistance to common scab, early blight, late blight and virus diseases. The work was done cooperatively with Mr. W. C. Edmundson of the Greeley, Colorado Potato Experiment Station and the Colorado State Experiment Station, Fort Collins, Colo., and also with other cooperating State stations. The reports from these cooperating States will cover data obtained there.

Object of the Investigations and Location of Experimental Plots

The object of the Potato-Breeding Program as conducted in Colorado is for the production of superior new varieties of potatoes, with particular reference and attention given to the production of scab-resistant varieties. Resistance of these new varieties to other diseases also received attention.

The hybridization work was conducted cooperatively with Mr. W. C. Edmundson of the U. S. Potato Experiment Station, Greeley, Colo. All crosses were made in the greenhouse at Greeley, Colo. First-year tubers were also grown in the greenhouse and the first-choice tubers from each plant grown in the field at Greeley. Selections were made from these family lines for further testing in the future.

One hundred seven 5-hill lots, selected from the family lines grown in the field at Greeley in 1946, were grown in 5-hill plots at Gilcrest, Colo., in scabby soil. One hundred twelve selections representing several family lines, tested previously in scabby soil, were again grown in this plot, and further selections made.

One hundred fifteen 5-hill lots representing 13 family lines from material grown at Crystal Lake, Iowa, in 1946, were grown in the Gilcrest, Colo., plot and selections were made for further testing.

Scab infection on the check variety, Bliss Triumph, was severe in the Gilcrest plot and this was a severe test of resistance to races of scab present in the sandy soil of the early crop section.

Breeding Work Conducted at Greeley, Colo.

A large number of crosses in which scab-resistant parent material was used were made in the greenhouse at the Greeley Station. A good set of seed was obtained and this will be planted in 1948. Current-season seed has given poor germination in past tests and only year-old seed is planted, except in certain cases. Approximately 8,000 seedlings, of which 7,113 were from crosses, were tested for scab resistance and other characters. A good crop of first-year tubers was obtained in November, 1947. These 7,113 tubers represent 51 crosses, and the first-choice tubers from each plant will be grown in an isolated plot at Yampa, Colo. Better germination and subsequent growth of tubers can be accomplished in the mountain plots. Selections will be made from these family lines in the fall of 1948, and a sample of each selection will be kept in the isolated plots for maintenance of the selection free from virus diseases.

Approximately 330 selections were made from the 1946 crop of first-year tubers grown at Greeley. These will be grown as 5-hill lots at the Greeley Station in 1948 with further solution at that time.

Location of Test Plots, 1947

Test plots were located in representative potato-growing areas at Del Norte, Montrose, Aspen, Yampa, and Gilcrest, Colo.

These areas represent the several types of soil and climates found in the State and each presents a different problem. The scab plot at Aspen, Colo., probably has the most severe type of scab to be found in the State. The Montrose area has a scab problem not especially severe but sufficient to discourage the growing of potatoes by many farmers. The San Luis Valley is generally free from serious scab infection on the Red McClure, the predominant variety, but certain areas consistently produce scabby potatoes in some of the most productive soils of the Valley.

The Yampa and Steamboat Springs area have some heavily-scabbed soils that cannot produce a high percentage of U.S. No. 1 potatoes. The scabby areas are local but numerous. Several races of A. scabies have been isolated from this area that are quite different parasitically from those from other areas. It was in the Steamboat Springs area that Yampa showed some No. 3 type scab pustules.

The Gilcrest Plot

A large number of seedlings were grown in the Gilcrest plot because the scab infection is severe and facilities for handling a large number are good. The severity of infection appears to vary little from year to year and a good test has been obtained for 7 consecutive years. A scab reaction on a variety in this plot is fairly indicative of its reaction in the early crop section.

The seedlings tested in this plot in 1947 were a few U.S.D.A. numbers from Maine, a large number of Colorado selections, and a number selected in the peat soil at Crystal Lake, Iowa. None of the Maine selections showed a high degree of resistance at Gilcrest. Only a few of the Colorado and Iowa selections showed enough resistance to warrant a further test.

Colo. table No. 1 shows the yield of 5 seedling varieties and Bliss Triumph from two seed sources. CS. 6317 significantly outyielded all other varieties tested. CS. 6344 again yielded high, but quality was poorer than Triumph. CS. 6316 produced a good-shaped crop of scab-free tubers. CS. 7285 was free from scab but shape of the tuber was not good. The mountain-grown foundation Triumph seed produced a more uniform plant than the certified Eaton, Colorado-grown seed, but did not significantly outyield the certified seed.

Colo. table 1. Comparative yield of four seedling varieties and Triumph from two sources of seed. Gilcrest, Colo., 1947.

Seedling or Variety	Yield per Acre
	Bu.
CS. 6316	600
CS. 6317	829
CS. 6344	738
CS. 7285	652
Bliss Triumph (a)	751
Bliss Triumph (b)	697

Difference required for significance at 5% point = 74.3 Bushels per Acre.

Bliss Triumph (a) from foundation seed grown at Yampa, Colo.
Bliss Triumph (b) from certified seed grown at Eaton, Colo.

Del Norte, Colo., Plot.

This plot is located in the San Luis Valley where the scab problem is one of local importance. Where scab exists in the soil it is usually severe, and the Red McClure Variety, almost exclusively grown, is heavily scabbed. Only certain fields of the Falk farm, where the plots were located again in 1947, produced scabby tubers. Ninety-one lots of 10 to 20 hills each of named and seedling varieties were grown on the scabby area. Several seedling varieties showed promise of yield, type, and disease resistance. CS. 7137, a red seedling, again was resistant to the race of scab present in the soil. Other red seedlings possessing desirable characters in other plots were found to be unsuited for growing from both cultural and disease reasons. Only 10 of the 91 lots tested here showed commercial promise. CS. 6317 was the best variety tested in this plot. It was free from scab and had high yield and good type. The demand for a red variety in this area is consistent and several red seedling varieties that showed some promise will be further tested in this plot in 1948.

Montrose, Colo., plot.

One hundred and forty 5-hill lots of seedling selections were planted on the Alvin Strand Farm near Montrose, Colo. This local area called Bostwick Park is highly productive, but considerable of the area produced scabby tubers. The race of scab found in soils here is not as virulent as many found in the State, but it is fairly widespread. Rural New Yorker, the variety commonly grown, scabs quite heavily, and leaf roll is a serious problem to seed growers.

Most of the lots in this test plot were tested here for the first time, and several showed promise of adaptation to this area and had scab resistance. Several red selections showed more than average promise.

CS. 6317 again produced a high yield of good tubers, and no leaf roll was noted in 200 hills grown from seed grown on this farm for 2 consecutive years.

Woody Creek Plot. Aspen, Colo.

This plot located on the Sullivan Vagneur farm in the most heavily scabbed soil in the State, included 100 lots of seedling selections, most of which were tested here for the first time. Few came out clean, or relatively so. This plot is a severe test and those showing any degree of resistance usually are highly resistant elsewhere.

CS. 8047, a red seedling selection, again showed high scab resistance in this plot. P. 95, an Indiana selection, was relatively free from scab here. U. S. B 395-5 also was highly resistant.

Menominee and Russet Burbank were grown commercially on this farm and both showed scab infection. The resistance of these two varieties varies from year to year. When Russet Burbank is scabby, Menominee is almost free from infection, and vice versa. Seldom do both varieties show severe infection the same season.

This plot serves as a severe test of all new seedling material, and the predominant race of A. scabies found in this soil appears culturally different from races from other areas of the State.

Yampa, Colo., Plots.

The Yampa, Oak Creek, and Steamboat Springs, Colo., area is located in the northwest part of the State. It is primarily a seed-growing area and grows excellent seed potatoes. Diseases and insects are not the serious problem of other areas. Virus diseases are the most important problems and, in a few cases, scab is a limiting factor in seed production.

The Yampa plot, located on the Allnutt ranch, is particularly adapted to growing isolated plots, and the soil is practically free from scab. There are no commercial potato fields in the vicinity and isolation of plots is accomplished readily.

C.S. 6317 was increased here and at Steamboat Springs on the Lloyd Williams ranch, as foundation seed. At Yampa, 27 100-lb. bags of this variety produced approximately 400 bags of foundation seed, sufficiently uniform in size to enable field-run to meet foundation requirements.

Of more promising seedling selections 35 lots were grown in tuber units. These lots will be used in further tests in 1948. Of first-year seedling tubers from the Iowa Experiment Station 2,200 hills were grown for Drs. Haber and Peterson. Also, 24 seedling selections were grown in ten 20-hill tuber unit lots for increase, and 200 hills of indexed units of 2 seedling varieties.

In 1948, all first-year seedling tubers grown in the greenhouse at Greeley, Colo., will be grown at Yampa. Selections made will be divided and part will remain in isolated plots here until tests in other areas indicate discarding advisable.

Summary

The breeding and testing of varieties of potatoes was conducted at Greeley, Gilcrest, Del Norte, Montrose, Aspen, Yampa, and Steamboat Springs, all in Colorado.

These places represent varying conditions for growth and disease factors relative to potato growing. A large number of new selections of seedling material was included in the scab test plots, and other disease and adaptability studies were made. From the test plots 60 selections were saved for further tests in 1948. All of these showed scab resistance in all plots and possessed other desirable characters.

A scab-resistant seedling selection (CS. 6317), was further tested in all plots and increased as foundation seed at Yampa, Colo., for distribution to growers by the Seed Certification Service of the Colorado A & M College, Fort Collins, Colo.

ALABAMA (Gulf Coast Substation)

Frank A. Garrett

In the spring of 1947, 21 varieties and seedlings were tested at Fairhope, Ala. Each variety was planted in 62-foot rows with 48 seed pieces per row and 3 feet between the rows in 4 replications. Fertilizer was used at the rate of 1,800 pounds of 4-10-7 to the acre. The plots were dusted 3 times with 35 pounds of 6-percent copper dust for control of blight and insects. One application of dust contained 3 percent of DDT.

The growing season of 1947 was cold and damp during February, March, and part of April, followed by periods of very hot weather. Late blight was first found on Pawnee as early as May 1. The Calrose was the only variety that did not come up to a good stand.

Alabama table 1 gives the yield data for these tests. Five varieties yielded significantly higher than the standard variety Triumph. They were: B 76-23, Teton, B 61-3, Pontiac, and B 70-5. The Sebago outyielded Triumph but not significantly.

Although the plots were dusted 3 times considerable late and early blight were present. There was almost a perfect correlation between the late blight readings in Alabama and those from the blight tests in Maine. Those with a zero reading in Maine showed a zero reading in Alabama; those with an intermediate type of resistance in Maine and those that were very susceptible showed the same reactions at Fairhope. Not too much resistance to early blight is apparent. B 70-5 showed 20 percent; Sebago, 10 percent; 403-5, 25 percent; Sequoia, 30 percent; B 73-16, 20 percent; Eire, 20 percent; and Calrose, 30 percent. Whether or not there is any significance in these relatively small percentages remains for other tests to determine.

Alabama table 1. Yield data of potato varieties and seedlings tested at the Gulf Coast Substation, Fairhope, Ala., 1947.

Seedling or variety	Maturity	Yield US No. 1 per acre		Late blight on leaves	Early blight on leaves
		Bu.	Pct.	Pct.	Pct.
B 76-43	Medium late	221	94	0	85
Teton	Medium	207	91	80	80
B 61-3	Late	200	89	0	90
Pontiac	Medium late	190	89	65	50
B 70-5	Late	183	91	0	20
B 73-10	Medium late	168	89	0	40
Ontario	Medium late	166	91	25	50
46952	Medium	163	92	60	50
B 87-1	Medium late	154	87	45	30
Sebago	Late	152	86	10	10
Pawnee	Medium	149	88	100	-
403-5	Late	142	84	0	25
B 76-23	Late	150	93	20	60
Triumph	Medium 5 days	130	78	90	90
Sequoia	Very late	145	91	30	30
B 69-16	Late	129	83	0	60
Mohawk	Late	125	83	25	50
B 73-16	Medium late	140	93	90	20
Erie	Medium late	105	79	80	20
LaSalle	Medium	76	84	30	80
Calrose	Very late	47	87	10	30

Difference required at the 5% level 38.

ALABAMA (Auburn)
C. L. Isbell

Spring and fall crops were grown for comparative observations on the behavior of some of the more recently introduced varieties and numbered or unnamed seedlings and older varieties.

Spring Crop- The soil used was Norfolk sandy loam that was only fairly uniform and of moderate fertility.

Fertilizer (6-8-4) was used at the rate of 1,500 pounds per acre applied one-half 10 days before planting and one-half at planting time.

The source of the seed potatoes available for use varied. Seed pieces weighed one ounce and were planted 1 foot apart in the drill with rows 3 feet apart and 48 feet long. Each variety was represented by one row 48 feet long in the blocks.

Planting was made February 18. Observational notes were made April 18, May 2, and May 23. Harvests were made on three dates. One-third of the plants were

taken up at each harvest. The weather at the time the potatoes were setting and making their early growth was too dry for best development. About the time the last harvest was made good rains greatly improved the appearance of the remaining plants. Delayed harvest of nearby plantings indicated that yields would have been considerably better on plots had harvest been delayed. Yield data for the spring-planted potatoes are given in Alabama table 1.

Fall Crop

Irish Potato - Variety comparison, fall of 1947 at Auburn, Alabama.

Seed potatoes from the spring crop at Auburn were cut to one ounce pieces and planted August 11 in moist sandy fertile soil 12 inches apart in the drill in rows 3 feet apart. The rows were 50 feet long. Dry weather was rather severe and stands and yields were somewhat low. Yield data for these tests are given in Ala. table 2.*

Alabama table 1. Yield data of potato variety tests at Auburn, Ala., 1947, spring-planted.

Variety	Harvest dates and yields per plot.			Average total per acre
	May 15	May 25	June 5	
	Lbs.	Lbs.	Lbs.	Bu.
Sebago 1/	9.0	21.8	26.1	72
Sequoia 2/	15.4	30.0	37.0	104
B 70-5 2/	20.0	32.9	42.0	118
Teton 2/	20.2	35.8	43.1	126
Sebago 1/	9.9	20.4	28.6	274
B 69-16 2/	20.2	42.6	51.3	144
Triumph 1/	10.3	25.4	40.8	96
Sebago 1/	8.3	19.7	22.5	64
Menominee 1/	15.5	23.0	28.1	84
Sebago 1/	9.8	22.9	27.9	76
Teton 3/	6.2	9.9	9.8	131
LaSalle 3/	5.8	6.7	5.6	91
Triumph 3/	8.2	10.4	11.8	153
Cobbler 3/	6.7	9.1	10.1	130
Sequoia 3/	6.8	7.8	8.8	118
Sebago 1/	2.5	6.9	10.3	99
Warba 3/	5.2	11.6	7.2	121
Sebago 3/	2.7	4.5	2.5	49
White Rose 3/	1.5	5.6	4.8	60
Pontiac 3/	6.2	14.4	14.3	176
Chippewa 3/	6.1	10.5	15.4	161
Sebago 1/	4.0	7.2	8.1	97

1/ Seed grown the previous fall at Auburn.
2/ Seed received from P. I. Station, Beltsville, Md.
3/ Seed received from Gulf Coast Station as surplus from planting stock there.

* See table on page 29.

Alabama table 2. Yield records in bushels per acre of varieties planted August 11 and harvested December 1, 1947, Auburn, Ala.

Variety	Average yield per acre
	Bu.
Triumph	27
Sebago	58
Teton	53
B 70-5	47
Triumph	49
B 96-16	11
Menominee	51
Sequoia	51
Warba	64
Chippewa	63
Pontiac	72
Cobbler	33
LaSalle	35
California Rose	38
Triumph	15
Triumph	51

ARIZONA (Yuma Research Laboratory)
Alton H. Finch

At Yuma, Ariz., a test of named and numbered varieties was made in comparison with the standard variety Triumph. The plots were planted January 22, 1947. The soil was prepared for planting by flood irrigating on January 20, so it was uniformly moist when the potatoes were planted.

The sets were dropped about 6 inches apart in the row. The beds were about 10 inches high and the seed was covered 6 inches. Each variety was planted in a plot consisting of 2 rows, 20 feet long, spaced 3 feet apart. Plots were randomized and replicated 4 times. The first harvest was on April 21; the second on May 23. The first harvest was made in the approximate season of high prices for new potatoes. The second one was approximately the latest date that potatoes would be economically held in the field.

It will be noted in Ariz. table 1 that the yield of U. S. No. 1 tubers from the early-harvested Triumph grown from seed produced in Maine was very significantly greater than that of the early-harvested Triumph grown from Nebraska seed. Seedling B 61-3 yielded 4 bushels more than the Maine-grown Triumph in the early harvest and exceeded it by 24 bushels per acre in the late harvest. B 70-5 was outyielded by the Maine-grown Triumph in the early crop but outyielded the Triumph significantly at the time of the late harvest. Pontiac yielded about the same as Triumph on April 21 but outyielded it significantly on May 23.

The U. S. D. A. varieties were outstanding in tuber characteristics, especially in shallowness of eyes, smoothness, and overall attractiveness. Most promising in yield were Sequoia, Sebago, B 61-3, B 70-5, and Pontiac. Of the other varieties, Red Warba and Triumph showed up well. The variety B 61-3 was outstanding for its pure white color. The Red Warba was outstanding for its bright red color. All varieties were exceptionally bright and clean at the first harvest but deteriorated by the time of the second harvest. It would appear that on the Yuma mesa potatoes should not be left in the ground later than early May. There was a substantial increase in yield between the first and second harvests.

Arizona table 1. Yield data for 16 varieties of potatoes grown at Yuma, Ariz., in 1947.

Variety	Source	Yield per acre of U. S. No. 1's			
		Harvest, April 21		Harvest, May 23	
		Total	1½ inches or more	Total	1½ inches or more
		Bu.	Bu.	Bu.	Bu.
Sebago	U.S.D.A.(Maine)	183	133	208	177
Sequoia	"	199	147	282	234
Triumph	"	183	142	198	172
Houma	"	186	85	190	184
Katahdin	"	158	102	178	182
Red Warba	"	183	142	207	187
B 61-3	"	187	143	236	196
B 70-5	"	155	115	239	215
Earlaine	"	150	92	227	179
Irish Cobber	"	152	69	207	153
Great Scott	Oregon	166	123	193	165
Triumph	Nebraska	180	120	207	158
Pontiac	U.S.D.A.(Maine)	182	144	241	231
Calrose	California	194	91	253	188
Erie	U.S.D.A.(Maine)	155	96	234	197
Triumph	Nebraska	163	74	189	144
L.S.D. at 5-percent level		28.5	29.7	37.8	38.7

ARIZONA

A. L. Harrison

Observational tests were conducted at Mesa, elevation 1,200 ft. and at Safford, elevation 2,900 ft. The observations at Mesa were made on single-row plots, 30 ft. long. The plots at Safford were single rows, 48 ft. long, with 2 to 4 replications, depending on the quantity of seed available. Because of this no statistical analysis could be run on the test. The yields of some varieties were fairly good at Mesa, but all were poor at Safford.

Mr. Mark Bliss, in charge of the new Safford Expt. Farm, had considerable trouble with salt damage on practically all vegetables. The salt was so high in the potato test that poor vine growth occurred on all varieties, which is the major reason for small sizes and poor yields. Most varieties produced a fair number of good tubers, but in most cases they were too small to be classed as good tubers. Tubers 1 1/4 to 1½ inches in diameter were considered as good tubers. Weight of tubers classified as culls is not included. All tubers were good-shaped and smooth, and the cull class was strictly small-sized tubers.

Arizona table 2 gives the yields of the tests at Mesa and Safford.

Mesa			Safford		
Variety 1/		Yield of good tubers per acre	Variety 1/		Yield of good tubers per acre
No.	Name		No.	Name	
		Bu.			Bu.
20	Irish Cobbler	129	26	B 76-43	80
25	Warba (white)	125	20	Irish Cobbler	72
10	Pontiac I	116	11	B 70-5	63
11	B 70-5	112	4	Katahdin I	48
29	Teton	110	12	Katahdin II	58
28	B 69-16	104	10	Pontiac I	57
13	Green Mountain	102	27	Pontiac II	39
19	Triumph	101	29	Teton	55
23	Kasota	95	16	Chippewa	46
26	B 76-43	95	21	X 150-10	46
16	Chippewa	92	25	Warba	46
9	Ontario	90	17	Earlaine	41
17	Earlaine	88	23	Kasota	38
1	Sequoia I	83	28	B 69-16	36
4	Katahdin I	83	3	Sebago I	15
3	Sebago I	77	14	Sebago II	34
22	Mohawk	52	19	Triumph	31
6	Virgil	50	1	Sequoia	28
7	Chenango	19	24	Sequoia II	18
8	Early Rose	18	13	Green Mountain	28
			22	Mohawk	27
			15	B 494-1	21
			2	Houma	18
			18	B 137-5	16
			8	Early Rose	15
			9	Ontario	14
			7	Chenango	12
			6	Virgil	5
			5	Empire	0

1/ Sequoia I, Sebago I, Katahdin I, and Pontiac I were obtained from New York, and Sequoia II, Sebago II, Katahdin II, and Pontiac II were obtained from Dr. F. J. Stevenson, U.S.D.A.

CALIFORNIA
Glen N. Davis

In 1947 potato test plots were planted at Shafter, Colma, and Tulelake, Calif.

In the yield test plot at Colma 9 varieties were planted. Sequoia, as in 1946, gave the highest yield and produced the best-appearing tubers. Bliss Triumph was used as the check. Yield data are presented in Calif. table 1. As a result of the trials of the past 2 years, it is anticipated that a limited commercial acreage of Sequoia will be planted in the Colma district in 1948.

At Shafter, in the San Joaquin Valley, 8 named varieties and the scab resistant seedling 6316 were planted in the yield test in 5 replications of 25 hills each. White Rose was the check variety. Yield data are presented in Calif. table 2. The performance of 6316 was disappointing. Its yielding ability was not particularly significant since this line, planted because of its scab resistance in other areas, was not resistant to scab under Calif. conditions.

At Shafter, 20 numbered seedlings were planted in single rows, 25 hills per row. These were planted for a yield test and for general observation regarding adaptability and vine and tuber characteristics. Data on the seedlings are presented in Calif. table 3.

Five seedlings with the variety White Rose as a check were planted in soil heavily infested with scab. None of the lines was resistant. Notes are given in Calif. table 4.

At Tulelake 9 named varieties and 18 numbered seedlings were planted in single rows with 25 hills per row. The data from Tulelake are given in Calif. table 5.

Severe leaf roll infection and internal browning of potatoes in storage, with subsequent loss of market value, are becoming quite serious in the Tulelake district. There is still some question whether or not the internal browning is connected with leaf roll. 1/ In any case, it is becoming increasingly important to gather information on varieties and seedlings with the possibility in mind of finding something that can replace the high-qualtiy Netted Gem generally grown in this district.

1/ I have just talked with Dr. Oswald from the Department of Plant Pathology. He says that there are two distinct types of internal browning in the Tulelake district. One, a deep-netted type, difinitely associated with leaf roll, and a second or shallow-type not associated with leaf roll.

California table 1. Potato variety trial, San Mateo County, Calif., 1947.

Variety	Mean yield per plot
	Lb.
Houma	37.9
Pontiac	47.1
Red Warba	41.1
Chippewa	37.8
Sebago	44.4
Sequoia	58.1
Mohawk	56.1
Teton	38.5
Bliss Triumph	40.4

Least significance difference ..... 16.3 lb.
Least highly significant difference 22.0 lb.

1/ I have just talked with Dr. Oswald from the Department of Plant Pathology. He says that there are two distinct types of internal browning in the Tulelake district. One, a deep-netted type, definitely associated with leaf roll, and a second or shallow-type not associated with leaf roll.

Calif. table 2. Variety and mean yield per plot in tests at Shafter, Calif., 1947.

Variety	Mean yield per plot
	Lb.
White Rose	49.0
Red Warba	65.7
6316	15.8
Netted Gem	25.0
Sebago	58.7
Pontiac	68.5
Houma	61.3
Chippewa	66.0
Sequoia	54.7

Least significant difference - 6.06 lbs.
Least highly significant difference - 8.16 lbs.

Calif. table 3. Seedlings, yields per 25 hills, and remarks on tests at Shafter, Calif., 1947.

1947 No.	Yield per 25 hills	Remarks
	Lb.	
B 61-3	64.0	Excellent appearance: smooth, white, round, slightly flat.
B 69-9	52.0	Discard
B 69-16	74.0	Round, smooth, slightly flat, white.
B 70-5	67.0	Do
B 73-13	64.0	Discard
B 73-16	74.0	Do
B 76-33	59.5	Good appearance: round, smooth, slightly flat, white.
B 76-43	70.0	Discard
B 235-16	50.0	Do
B 400-1	28.0	Do
B 591-31	56.0	Good appearance: white, smooth.
B 591-52	54.0	Discard
B 591-54	48.0	Excellent appearance: round, slightly flat, very smooth, white.
B 594-1	55.5	Discard
B 595-17	58.5	Do
B 595-20	47.0	Do
B 595-21	49.0	Do
B 595-68	55.0	Do
B 595-95	56.0	Good appearance: smooth, white.
B 604-1	64.0	Discard

Calif. table 4. Check, seedlings, and remarks on scab test plot at Shafter, Calif., 1947

1947 No	Remarks
White Rose check	Very susceptible
B61 3	" " more so than White Ros -
B400-1	" " " " " " "
B592-95	" "
B594-1	" "
6316	" "

Calif. table 5. Variety, hills harvested, and yields in potato trials at Tulelake, Calif., 1947.

Variety	Hills harvested	Total weight	Weight per hill
	No.	Lb.	Lb.
Teton	25	101.3	4.05
Sequoia	25	75.3	3.01
Mohawk	22	58.5	2.66
Pontiac	25	65.0	2.60
Chippewa	22	63.8	2.90
Sebago	25	64.5	2.58
Red Warba	24	64.0	2.66
Houma	25	68.0	2.72
Netted Gem	22	23.3	1.06
B69-9	17	47.8	2.81
B69-16	25	70.0	2.80
B70-5	24	82.8	3.45
B73-13	22	63.5	2.88
B73-16	23	65.5	2.85
B76-23	20	66.5	3.32
B76-43	23	89.3	3.88
B235-16	23	59.8	2.60
B400-1	23	57.5	2.50
B591-31	23	65.5	2.85
B591-52	24	45.3	1.88
B591-54	23	62.5	2.70
B592-95	24	57.5	2.48
B594-1	21	49.8	2.37
B595-20	8	18.5	2.31
B595-21	14	34.8	2.48
B595-68	24	69.5	2.89
B604-1	24	81.8	3.41

CONNECTICUT

L. C. Curtis and John Scarchuk

Thirteen potato varieties and strains were obtained from the U.S.D.A. in 1947 for yield testing and observation at Storrs, Conn. They were received in good condition and planted on May 15 in 3 randomized blocks with 30 hills for each variety in each block. The plots were fertilized with 1,500 pounds per acre of 5-10-5 fertilizer in the row before planting. Favorable growing conditions prevailed throughout the season. Two dustings of copper were applied as protection against late blight and one dusting of D.D.T. was applied for flea beetles. The crop was harvested in October. The yields in pounds per plot were recorded for No. 1 potatoes and the data were analyzed by the analysis of variance method. The F value for replications was below the 0.05 point and the F value for varieties was above the 0.01 point. The L. D. values for significance at the 0.05 and 0.01 points were found to be 12.4 and 16.8, respectively.

The mean value for the plots of 30 plants for each variety is shown in column 1 of Conn. table I. Also in this table the varieties are ranked along the left-hand side from lowest to highest. Across the top of the page from left to right the varieties are listed from highest to lowest. The difference between any two varieties is recorded in the appropriate square opposite and below the two varieties. Only significant differences between any two varieties are recorded.

Conn. table 1. Mean Yield in Pounds per Plot of 30 Hills for 13 Varieties of Potatoes at Lee Farm, University of Connecticut, Storrs, in 1947

Differences between varieties in vertical and horizontal columns, where significance differencies were found

	Mean	Chippewa	Katahdin	Pontiac	Houma	B70-5	Teton	Sebago	Sequoia	B69-16
Pawnee	35.3	30.0	26.4	25.7	25.4	19.7	18.0	15.7	15.4	15.0
I. Cobbler	38.7	26.6	23.0	22.3	22.0	16.3	14.6			
Mohawk	42.3	23.0	19.4	18.7	18.4	12.7				
Green Mt.	46.0	19.3	15.7	15.0	14.7					
B69-16	50.3	15.0								
Sequoia	50.7	14.6								
Sebago	51.0	14.3								
Teton	53.3									
B70-5	55.0									
Houma	60.7									
Pontiac	61.0									
Katahdin	61.7									
Chippewa	65.3									

L. D. values for significance at .05 point = 12.4

L. D. values for significance at .01 point = 16.8

FLORIDA

A. H. Eddins and E. N. McCubbin

Freezes during Feb. caused only slight damage to test plots of potatoes at Hastings, but a rainfall of 6.04 inches during a 6-day period in mid-April stopped growth of potato plants about 5 weeks before the end of the growing period and reduced yields to about one-third normal.

Four standard varieties and 16 seedling crosses were tested for yield and adaptability in one series of plots. Seed of Placid, Chenango, Virgil, and DUA-11 was supplied by the Cornell Agr. Expt. Sta., and seed of the other crosses was furnished by the U.S.D.A. The potatoes were planted January 14 and dug May 9. Results are given in Fla. table 1.

Sequoia and the USDA cross B 76-43 produced the best yields; each exceeded the yield of Sebago almost 100 percent. B 61-3 was the only other selection that significantly outyielded Sebago. The poorest yielding ones were DUA-11, B 70-4, X 494-1, 927-3, and Chenango. Seed of Chenango was inferior, as 42 percent of the plants were affected with leaf roll.

In another test, Sebago outyielded 20 late-blight-resistant crosses from the N. Y. Agr. Expt. Sta. (Fla. table 2). ECU-1 and Katahdin were the only ones that did not yield significantly less than Sebago. One red tuber cross, CZK-7, and 4 white crosses, DUA-11, DAB-18, ECU-1, and ECU-2, have been selected for further testing on the basis of shape, smoothness, and color of tubers.

(See pages 38 and 39 for Tables 1 and 2.)

FLORIDA (Belle Glade)

James C. Hoffman

In the spring of 1947, 39 seedlings and varieties of potatoes were tested at the Everglades Experiment Station, Belle Glade, Fla. The yields per acre and reactions to late blight and bacterial wilt are given in Florida table 3. B 69-16 gave the highest yield, followed by B 76-43, Pontiac, and B 70-5.

I believe a very desirable white potato can be selected from the U.S.D.A. stocks for this area if we follow up the tests.

Even though the yields are generally low in this area, probably due to short days and other factors, some of the growers are going to plant potatoes as they generally get an excellent price, so we had just as well give them the best seed stocks and overcome some of the factors beyond our control. Pontiac is probably the leading variety in this district at present. However, it cracks very easily and is somewhat rough with a russet skin condition, whereas some of the U.S.D.A. seedlings do not produce this russeting.

Florida table 1. Yields of 20 seedlings and varieties of potatoes grown at the Potato Laboratory, Hastings, Fla., 1947

Variety 1/ or Seedling	Yield per acre of U.S. No. 1 tubers	
	Total	Increase over Sebago
	Bu.	Bu.
B 76-43	102	49
Sequoia	100	47
B 61-3	79	26
B 69-16	73	20
Pontiac	70	17
96-56	61	8
B 69-12	59	6
B 73-10	55	2
Sebago	53	-
B 87-1	51	-2
B 70-5	50	-3
Placid	45	-8
Katahdin	43	-10
1122 Dist	43	-10
Virgil	40	-13
DUA-11	23	-30
B 70-4	22	-31
X 494-1	14	-39
927-3	12	-41
Chenango	9	-44
Least Significant difference		23

1/ Grown in 25-foot plots and replicated 5 times in rows 40 inches apart. Planted January 14 and dug May 9.

Florida table 2. Yields of Katahdin, Sebago, and 20 New York late-blight resistant potato crosses grown at Hastings, Fla., in 1947.

Cross or Variety 1/	Yield U.S. No. 1 tubers per acre 2/	
	Total	Less than Sebago
	Bu.	Bu.
Sebago	92	-
ECU-1	88	4
Katahdin	78	14
DUA-11	67	25
DAB-18	66	26
DMJ-3	64	28
CZK-7	64	28
DFC-1	64	28
ECU-2	63	29
DAC-1 (Placid)	54	38
CYJ-1 (Virgil)	52	50
DBT-14	47	45
CRH-7 (Empire)	44	48
DUY-2	39	53
DSC-1	38	54
DAB-3 (Pre-Empted)	26	66
EUI-2	23	69
CUI-2 (Chenango)	20	72
CRH-3	17	75
ECM-2	11	81
BYI-1	10	82
CFS-11	3	89
Least significant difference		17

1/ All had tubers with white skins except DMJ-3, CZK-7 and DAB-3 whose tubers were red.

2/ Average of 5 replicates planted in 25-foot single-row plots in a randomized block arrangement.

Florida table 3. Potato strain and variety trials, Everglades Experiment Station, Belle Glade, Fla., 1947.

No.	Strain or Variety	Total Yield Per Acre 1/	Late Blight	Bacterial Wilt
		Bu.	2/	3/
1.	X 403-5	212	0	3
2.	X 927-3	91	0	2
3.	B 61-3	49	0	1
4.	B 69-16	300	0	1
5.	B 70-5	272	1	1
6.	B 76-43	292	0	4
7.	B 137-5	233	0	3
8.	B 142-7	107	1	2
9.	X 150-10	65	0	5
10.	X 494-1	142	0	3
11.	590-7	67	0	5
12.	Pontiac	288	1	2
13.	Katahdin	219	0	4
14.	Sequoia	181	0	2
15.	Mohawk	134	1	4
16.	Sebago	169	1	3
17.	Green Mountain	160	1	3
18.	Chippewa	208	1	3
19.	Earlaine	92	0	4
20.	Teton	158	1	4
21.	Warba	156	0	4
22.	Triumph	212	1	4
23.	Kasota	183	0	2
24.	White Rose	213	0	1
25.	24-38-3	175	0	3
26.	SNO 48-12	170	1	3
27.	Red Warba	131	0	4
28.	Kasota	209	0	2
29.	No name	184	1	3
30.	Marigold	100	0	0
31.	Triumph	58	0	0
32.	Pontiac	104	0	1
33.	1003	0	0	2
34.	2642	140	1	1
35.	2605	147	0	3
36.	1008	27	0	1
37.	1403	12	0	1
38.	1002	39	0	1
39.	1054	125	0	1

1/ Total yield in bushels per acre, calculated by multiplying yield by the factor 4.9. To be significant it takes a difference of 68 bushels between any two strains or varieties, at the 5-percent level.

2/ 0-no infection, 1-slight infection.

3/ 0-no infection, to 5-seriously damaged.

Hawaii

W. A. Frazier

Potatoes were planted at the Makawao substation for observation on resistance to early blight and/or late blight. Because of extreme defoliation by late blight, no notes on early blight were recorded.

Hawaii table 1 shows late blight readings. The first late blight lesions were noted December 16 on the variety Teton, 39 days after tubers were planted. By late January late blight had caused heavy damage on all lines in the test.

While certain lines such as B 70-5 showed some tolerance to late blight, it was obvious that under conditions such as those prevailing in the 1946-47 winter test a higher degree of resistance to the organism is required.

Hawaii table 1. Late blight notes on potato varieties and seedlings, Makawao, Maui, Hawaii, 1946.

(Planted Nov. 7, 1946. Notes recorded Jan. 30, 1947)

Hawaii Acc. No.	USDA Designation	Late Blight 1/
103	672-38	3-4
339	627-209	4
630	B313-32	3
644	B273-39	4
607	XL 134-2	4
629	B313-16	4
661	B434-127	4
681	XL175-2	4
687	XL181-3	4
676	XL146-1	4
696	X512-1	4
698	B69-9	4
699	B69-16	3-4
670	XL133-1	4
697	B64-2	3-4
692	XL201-2	4
701	B70-5	3
702	B72-11	3
703	B73-2	3
707	B76-31	3-4
709	B77-32	3-4
710	B81-17	4
719	B142-8	3
723	B287-2	3-4
Bliss Triumph		4
Teton		4
Sebago		4
Sequoia		4

1/ 0 = no blight, 1 = few lesions on leaves, 2 = moderate leaf infection 3 = severe infection - largely defoliated, 4 = plants dead.

INDIANA (Walkerton)

Kent Ellis

In 1947, 71 named and numbered varieties were tested on the Purdue Muck Crops Farm at Walkerton, Ind. Data were taken on time of maturity, yield, skin character, depth of eyes, tuber shape, scab, growth cracks, and second growth. The highest yielder in the group was B 592-79 with a calculated yield of 883 bushels of U.S. No. 1 tubers per acre. This showed an immune reaction to the common forms of late blight in the Maine tests. It was medium in maturity at Walkerton. Its tubers had smooth skin and shallow eyes, but their shape was not so good and they showed pitted scab and growth cracks, which would be reasons for discarding the variety. However, the yield does show the potentialities of some of the U. S. D. A. seedlings. B 70-5, another blight-resistant seedling, gave a yield of 820 bushels per acre, but it too showed pitted scab and some growth cracks. Teton and Pontiac both showed growth cracks which might indicate that the conditions were rather favorable for abnormal growths. B 61-3, a U.S.D.A. seedling variety, resistant to scab and blight in Maine, yielded about 700 bushels per acre. Its tubers were somewhat irregular, it showed some surface scab, and while no growth cracks developed a certain amount of second growth occurred. The Red Warba yielded approximately 470 bushels per acre. It had smooth skin, deep eyes, irregular shape, pitted scab, and growth cracks. The Chippewa, a variety rather extensively grown on muck soils in Indiana, yielded 545 bushels per acre. Its tubers had smooth skin, shallow eyes, surface scab, no growth cracks and no second growth.

In the group of 71 varieties, 3 were very early, 17 early, 23 medium, and 28 late. B 595-137, another blight-resistant seedling, was very early and gave a yield of 677 bushels per acre as compared with 470 bushels for the high-yielding early Red Warba.

Of course conclusions cannot be drawn on one year's results, but the data do show the progress that is being made in producing early, high-yielding blight-resistant varieties.

IOWA

C. E. Peterson and E. S. Haber

Potato-breeding work at the Iowa Station has been directed toward development of scab-resistant varieties. Scab resistant, red selections have received particular attention. Objectives are being expanded to include resistance to late blight and to certain of the virus diseases.

Growing conditions were especially unfavorable in 1947. Floods in early July destroyed some of the breeding material and all of the yield trials. During the latter part of the summer, there was very little rain. Because of weather conditions, scab was especially severe. This made possible the elimination of nearly all susceptible hills in the first-year test.

About 1,500 hills from 46 crosses were grown on peat in northern Iowa. Of these first-year hills, only 25 were selected. In the second and third year material, 202 selections were grown in 10-hill observation lots. Twenty-eight selections were made on the basis of second and third-year observation lots.

Of these, 11 had been included in the increase plots in Minnesota so that sufficient seed is on hand for yield trials in Iowa in 1948. The remaining 17 selections will be increased in Minnesota in 1948.

The 1947 season was the first in which the Iowa Station has undertaken to get the first increase in Colorado. With the cooperation of L. A. Schaal, 88 hill selections were increased in the Yampa Valley in 5-hill lots. It is hoped that this arrangement will provide disease-free seed of the selections made in Iowa. It is proposed to use the Colorado seed as foundation stock for the second increase in Minnesota. Some 1,200 first-year hills from crosses made in Iowa were also grown in Yampa Valley. Fifty selections were made for further test in Colorado.

A number of crosses were made in the greenhouse at Ames in the spring of 1947. About 6,500 seedlings from these crosses are growing in the greenhouse and will be harvested about February 1, 1948.

LOUISIANA

J. C. Miller

In 1943 the DeSoto and LaSalle were released. This year the LaSoda is being introduced. This seedling was formerly known as L-36. A brief description of this variety is as follows:

The LaSoda is a cross between the Triumph and Katahdin and was first grown in the fall of 1936. The plant is of medium vigor and very upright with medium to small leaves. It blooms more freely than the Triumph and the flowers are purple. The tubers are semi-round to slightly oblong, similar to those of the Katahdin. The color is a very bright pinkish red and the skin is very smooth. The eyes are medium in depth to very shallow. This variety is early to medium early. While it shows some resistance to mosaic it it not in any way immune.

Table 1 gives the yields of the three Louisiana varieties as compared with the Triumph as a standard. It will be noted in every instance that each of the three new varieties significantly outyielded the Triumph and that northern and Louisiana Fall-grown seed significantly outyielded Louisiana spring-grown seed.

Table 1. Yield per Acre of Marketable Potatoes and Source of Seed Test of 3 New Louisiana Irish Potatoes.

Variety	Yield per acre and Source of Seed			
	Louisiana Spring	Northern	Louisiana Fall	Variety 1/ Average
	Bu.	Bu.	Bu.	Bu.
Triumph	87	163	152	134.0
DeSoto	115	224	205	181.3
LaSoda	96	254	189	179.7
LaSalle	121	216	223	186.7
Source of Seed 2/ Average	104.8	214.3	192.3	

1/ Difference necessary for significance - 23.20 bu.
2/ Difference necessary for significance - 20.80 bu.

The LaSoda produces higher yields than the Triumph and the potato has a bright red velvet appearance which appeals to the consumer so much that when placed on the market has sold at 15 to 25 cents per hundred premium over other varieties. This fact alone cannot be overlooked. These varieties like all others must be grown in various areas and if they perform as well in other areas as they have in Louisiana they will continue to be increased. Four seed potato producing areas are now increasing these varieties for distribution and a limited amount of seed is now available.

MAINE

Reiner Bonde

The results of the tests of seedlings of different progenies for resistance to ring rot through 1946 have been summarized in the August 1947 issue of Phytopathology. The studies were continued in 1947. Approximately 551 seedlings were included in the test, the results of which are summarized in Maine table 1.

The percentage of seedlings that survived the inoculations without contracting ring rot is somewhat less than that for previous years. The number of resistant seedlings with good tuber type and other desirable marketing qualities was greatly increased. There were no extremely late seedlings with ill-shaped tubers. Several promising ring rot resistant seedlings were selected, which possess desirable foliage characteristics, attractive tubers, and high yielding ability. Resistance to ring rot also was found in combination with resistance to late blight infection, both in the foliage and the tubers.

The reactions of 7 named and 3 numbered varieties are given in Maine table 2. Teton was again free from ring rot. Erie, a sib of Teton, showed 40% ring rot. In contrast with these, Katahdin, Earlaine, 96-44, Hindenburg, and B 287-2 were 100% infected.

Maine table 1. Ring rot resistant seedlings in different progenies inoculated in the field in 1947. Ring rot in controls included for comparison 1/

Variety or Cross	USDA pedigree	Seedlings and controls tested	Resistant seedlings or lots 2/	
		No.	No.	Percent
Katahdin controls		103	0	0.0
Earlaine x Teton	B721	53	26	49.0
Katahdin x Teton	B737	14	4	28.6
Sebago x Teton	B723	43	7	16.3
Sequoia x Teton	B724	28	3	10.7
Teton x Hindenburg	B731	12	1	8.3
Teton x Katahdin	B744	27	1	3.7
Teton x B38-16	B745	37	2	5.4
Teton x B287-2	B746	55	4	7.3
055 x Teton	B760	26	2	7.7
96-44 x Teton	B762	72	5	6.9
157-9 x Teton	B766	86	12	14.0
336-184 x Teton	B725	58	18	32.2
792-96 x Teton	B780	19	3	15.8

1/ Five seed pieces of each seedling were inoculated by being dipped in a heavy suspension of the bacteria and planted immediately in the field.

2/ Showed no ring rot in foliage or in tubers at time of harvest.

Maine table 2. Ring rot in parents of seedlings of different progenies inoculated in the field in 1947

Variety or Seedling	Stake No. 1947	Inoculated	Without Ring Rot	
		No.	No.	Pct.
Sebago	552	5	2	40
Katahdin	553	10	0	0
Sequoia	554	5	1	20
Teton	555	5	5	100
Earlaine	556	5	0	0
Erie	557	5	3	60
792-96	558	5	1	20
96-44	559	5	0	0
055	560	5	2	40
Hindenburg	561	5	0	0
B287-2	562	5	0	0

M A I N E

Donald Folsom

Starting in 1938, field resistance to leaf roll has been tested in potato seedling varieties on Highmoor Farm in southwestern Maine, with every third row of the test planted to leaf roll Chippewa, except in 1938 when leaf roll Green Mountain was used. The first crosses in the test showed very little resistance and yielded very few commercially desirable seedlings, but with the use of resistant Highmoor Farm seedlings as parents, starting in 1943, more resistance has been found and also a somewhat higher proportion of seedlings with fairly good commercial characteristics.

Many leaf-roll-resistant seedlings have had to be discarded in the field at Highmoor Farm for flagrant defects such as growth of sprouts, nipples, and knobs from the eye end; and leaf rolling, weak vines, poor vine type, poor tuber shape, low yield rate, and rough skin. Whole tubers are planted at Highmoor Farm, but usually a seedling with many stalks per eye and therefore with too many and too small tubers will show the same characteristics when tested at Aroostook Farm planted as 2-ounce seed pieces.

Many seedlings have been tested from crosses between leaf-roll-resistant Highmoor Farm Seedlings and commercial varieties, in the hope of getting a higher proportion of commercially desirable seedlings than those from crosses between leaf-roll-resistant seedlings. This has not worked out, and the best plan now seems to be to use crosses between leaf-roll-resistant seedlings or between these and others showing resistance to both ring rot and late blight. A cross of the latter type, X 1276-185 x B 355-24, was in the Highmoor Farm test in 1947 and showed high vigor in most of the seedlings. Seedling B 446-25, found resistant to ring rot and late blight in the Aroostook tests of Bonde and Schultz, considered commercially desirable by Akeley, and escaping leaf roll in an Aroostook Farm epidemic, took very little leaf roll at Highmoor Farm in 1946, its first year there. Such a seedling, even if not surviving further testing at Highmoor Farm, should be a desirable parent for crossing with various Highmoor Farm leaf-roll-resistant seedlings.

Observations in 1947 on Crosses Introduced in 1946 from U.S.D.A., Beltsville, Md.

In 1946 five crosses from U.S.D.A., Beltsville, Md., were used in the Highmoor Farm test. About a third of the 1,959 seedlings were discarded in 1946 for poor vines or tubers. The Highmoor Farm leaf-roll-resistant seedling B 24-58, when used as a parent crossed with B 38-16, passed on 22 percent leaf roll resistance, whereas the Highmoor Farm leaf-roll-resistant seedling X 1276-185 passed on 1 percent. However, X 1276-185, when used as a parent with B 61-3, passed on 26 percent leaf roll resistance. Apparently the advantage to be gained by using Highmoor Farm leaf-roll-resistant seedlings is variable. Weak and otherwise poor vine type and poor tuber shape were the chief causes for discarding in 1947. One hundred forty-one were kept for observation in 1948.

Highmoor Farm Field Test vs. Aroostook Farm Aphid Test

In 1945, 7,637 seedlings were tested for the first time in the aphid test for leaf roll resistance at Aroostook Farm, and 1,563 in the Highmoor Farm field test. Nearly half of those at Aroostook Farm were from crosses the parents of which were leaf-roll-resistant Highmoor Farm seedlings, whereas less than 10 percent of the Highmoor Farm seedlings were from such crosses. The others in each place were from crosses with one parent a leaf-roll-resistant Highmoor Farm seedling. In any equivalent test the Aroostook Farm seedlings should have shown more resistance. With the aphid test more severe, since so far all field-resistant Highmoor Farm seedlings tested have become readily infected with leaf roll, about 91 percent were eliminated for leaf roll from the Aroostook Farm tests by the fall of 1947. Of the remaining 66, 4, or 0.05 percent of the original 7,637, at Highmoor Farm were considered to have good vines and tubers. By the end of 1947, of the Highmoor Farm group about 41 percent were eliminated for leaf roll and about 58 percent for poor vines and tubers, leaving 15 or 0.96 percent of the original 1,563. Thus, about 19 times as many were left from the Highmoor Farm test as field resistant and perhaps commercially desirable as from the Aroostook Farm test as resistant to aphid inoculation and perhaps commercially desirable. Although more seedlings can be tested with aphids, for every possibly commercial seedling left, 18 which might be field resistant and also possibly of commercial type are eliminated by aphid-transmitted leaf roll. It is a question whether the more severe test is worth while at present when it is so hard to find replacement varieties even in field-resistant populations. Since a passing of the field test is all the potato grower needs, it would seem better to use the field test and have 19 times as many possibly commercial seedling per 1,000 tested seedlings to choose from for critical tests. Even if 19 times as many seedlings can be aphid tested as can be field tested with the same effort, and 38,000 seedlings of desirable crosses are available for the aphid test each year, considerably more effort is involved in the breeding of 19 times as many seedlings and in the harvesting, storing, and replanting of the 10,000 seedlings that would remain apparently healthy until the following growing season.

Yield Test on Aroostook Farm, 1947

The most promising leaf-roll-resistant seedlings introduced to Highmoor Farm in 1938 and 1939 were tested for yield, etc., on Aroostook Farm in 1944 and 1945. The crosses introduced to Highmoor Farm in 1940, 1941, and 1942 introduced only 4 resistant seedlings from a total of 4,600. However, the crosses introduced to Highmoor Farm in 1943, including 1,800 seedlings, contained dozens of resistant seedlings, due to the crosses that were made with or between some of the seedlings introduced in 1939 and found resistant. After considerable culling out for undesirable characteristics, 59 seedlings among those introduced in 1943 were selected for a yield test on Aroostook Farm in 1947. Included with these in the yield test were the 4 from the introductions of 1940-42, and 4 very promising ones from the introductions of 1944.

In comparison with the average yield rate of 548 to 560 bushels an acre for the 20-hill plots of the 3 commercial varieties, few of the seedlings stood the test. In view of the yield rates and the occasional noteworthy characteristics of various seedlings, most of those kept for retesting will probably be eliminated in 1948. Six seem promising. The first one, B 244-124, might be a substitute for Green Mountain; B 226-135 could be desirable in the South, especially in view of its resistance to late blight (immune to the common type in

Schultz's test); and B 420-174, B 420-186, B 420-215, and B 528-54 could perhaps be compared favorably with Katahdin or Chippewa.

Observations in 1947 on Crosses Introduced in 1947 from U.S.D.A., Beltsville, Md.

A cross between X 1276-185 and B 355-24, the latter resistant to ring rot and late blight, gave about 300 seedlings mostly vigorous, of which 129 were kept for observations in 1948. Another cross, X 1276-185 x Teton, gave about 60 seedlings, mostly small.

Prospects for 1948 and Later

Promised for the Highmoor Farm test in 1948 are about 650 tubers from crosses between X 1276-185 and seedlings resistant to both ring rot and late blight, and about 800 seedlings from crosses between B 522-33, resistant to aphid inoculations with leaf roll, and seedlings resistant to both ring rot and late blight. Further crosses of this kind are said to be in the making.

Seedling X1276-185

Ten plots of seedling X1276-185 were included in the Aroostook Farm yield test. In comparison with Chippewa, this seedling had fewer stems per hill, more tubers per hill, smaller tubers, and a lower yield rate. According to these data and past years' records, this seedling seems to be adapted to the area from Lee to Lewiston, Maine, as a substitute for Chippewa, more than to Aroostook or to Florida. A comparison in Mass. in 1947 by Dr. O. C. Boyd and Arthur and Harold Hubbard showed this seedling to be 7-10 days earlier than Chippewa and to yield 583 bushels per acre compared with 570 bushels for Chippewas, including 534 bushels U.S. No. 1 compared with 493 for Chippewa. In addition, compared with Chippewa, the skin of the seedling was less attractive and the eating quality was distinctly superior, as is generally true for Green Mountain in Maine. The tuber shape of this seedling in the Aroostook Farm 1947 test, as well as in other comparisons of this and previous years, was as good as that of Chippewa, being predominantly regular, smooth in outline, and like the best Green Mountains somewhat widened.

Three acres of seed of X1276-185 was grown in 1947 by Evan C. Cobb of Lee, Maine, who selected this seedling from a group of several that he tested several years ago. He selected this seedling as a good substitute for Chippewas as an early table variety in his area, and others grew 7 acres of table stock in 1947. The Maine Potato Seed Board, at last reports, were also growing some of this seedling as part of their foundation seed, pending a decision as to whether or not this seedling is worth their recognition.

M A I N E

G. W. Simpson 1/

The tests for leaf roll resistance at Presque Isle, Maine, were carried on as usual. Single hills of 8,313 seedlings were added to the test in 1947. Aphids

1/ Data in tables furnished by G. W. Simpson; comments by F. J. Stevenson.

were cultivated on leaf roll plants and on the seedlings in the tests infested with them. Very few seedlings have been found that will survive even the first year of such a test.

The results of these tests for the past 3 years are shown in Maine tables 3, 4, and 5. The highest percentages of survivors are found usually in crosses that had for parents two seedlings that have shown field resistance in Dr. Folsom's test at the Highmoor Farm, Monmouth, Maine. However, some of the seedlings showing resistance in the Highmoor Farm tests, such as B 24-58, are the poorest parents from the standpoint of tuber shape and other horticultural characters.

M A R Y L A N D

R. A. Jehle

Experiments with disease resistance, quality, vigor, yield and response to breaking dormancy with various treatments were continued in 1947 with various potato varieties and seedlings.

In the western part of the State where the elevation is 2,000 to 3,000 feet above sea level, experiments were conducted at Oakland, Maryland. In part of a field sprayed 10 times with Bordeaux mixture 4-4-50 with the addition of 1 pound of 50% wettable DDT, 10 varieties and 11 seedlings which usually mature after September 1 were planted in 5 randomized replications. The season was favorable for potato production with adequate moisture evenly distributed. Sequoia with 475 bushels per acre of U. S. No. 1 potatoes and Menominee with 471 bushels yielded most but did not significantly 1/ outyield Green Mountain with 441 bushels, seedling B164-15 with 441 bushels, Calrose with 431 bushels, seedling B69-16 with 425 bushels, Potomac with 422 bushels, Sebago with 421 bushels and Pontiac with 418 bushels. Mason Smooth Rural was only significantly outyielded by Sequoia and Menominee. Sequoia, Menominee, Potomac, Sebago, Pontiac and Smooth Rural continue to be valuable varieties for planting in western Maryland. Only a trace of scab has been found on Menominee tubers and it is recommended for scab-infested land. Sequoia and Potomac are recommended where large yields are desired but when late maturity is not objectionable, however, Potomac should not be planted on scab-infested land, and Sequoia should be dug when conditions are least favorable for the development of late blight rot. Sebago, Pontiac or Rural should be planted when earlier maturity is desirable. Further tests with the seedlings must be made before their merits can be determined.

In another part of the field sprayed 8 times with the same mixture, 10 varieties and 4 seedlings, which usually mature before September 1, were planted in 5 randomized replications. The largest yields were obtained from Houma with 344 bushels per acre of U.S. No. 1 potatoes, seedling Md. 13-129 with 315 bushels, Marygold with 306 bushels, seedling B61-3 with 303 bushels, and seedling 423-1 with 286 bushels. Irish Cobbler was significantly 2/ outyielded

---

1/ A difference of 60 bushels is significant at a 5% point. 2/ A difference of 91 bushels is significant at a 5% point.

Maine table 3. Reaction of Progenies of Different Crosses and Selfed Lines to Leafroll Infection Resulting from Artificial Inoculations with Viruliferous Aphids in 1947

Pedigree	Parentage	Planted 1947	Saved for retesting 1948	Percentage surviving 1 year's test
B1164	B294-38 selfed	310	19	6.1
B851	X1276-185 x X96-56	206	16	7.8
B852	X1276-185 x X157-9	280	38	13.6
B853	X1276-185 x B355-24	135	2	1.6
B854	X1276-185 x X792-94	176	34	19.3
B855	X1276-185 x B294-38	135	26	19.3
B856	X1276-185 x B66-1	137	9	6.5
B857	X1276-185 x B81-40	155	21	13.5
B858	X1276-185 x Katahdin	38	1	26.3
B859	X1276-185 x Teton	129	25	19.4
B860	Triumf x B294-38	63	7	11.1
B861	Dakota Red x X247-44	356	46	12.9
B862	Earlaine x X247-48	93	10	10.8
B863	Green Mountain x Triumf	112	11	9.8
B864	Houma x X247-48	393	81	20.6
B865	Katahdin x Triumf	469	23	4.9
B866	Katahdin x X247-48	491	23	4.7
B867	Mohawk x X247-48	244	9	2.7
B868	B24-78 x X247-24	415	88	21.2
B869	Sebago x X247-42	241	8	3.3
B870	Sebago x X247-48	34	0	0
B871	Shamrock x X247-48	76	5	6.6
B872	B24-76 x X24-238	479	80	16.7
B873	X247-44 x Teton	529	24	5.4
B874	X247-44 x B61-3	296	6	2.0
B875	X247-48 x Triumf	104	5	4.8
B876	X1276-179 x X247-48	681	76	11.2
B877	X1276-185 x Katahdin	220	21	9.5
B878	X1276-185 x 96-56	410	83	20.2
B934	055 x B294-38	108	2	2.0
B941	B294-38 x Katahdin	330	13	3.9
B942	B294-22 x B294-38	242	34	14.0
B943	B294-22 x 96-56	30	4	13.3
B954	Houma x X792-94	32	7	11.9
B955	Houma x Katahdin	11	6	54.5
B986	Houma x X792-94	63	11	17.5
B987	Katahdin x X792-94	90	9	10.0

Maine table 4. Reaction of Progenies of Different Crosses to Leafroll Infection Resulting from Artificial Inoculations with Viruliferous Aphids in 1946 and Reinoculated in 1947.

Pedigree	Parentage	Original number in progenies tested in 1946	Replanted 1947		Surviving 2nd inoculation in 1947 and saved	
			No.	Pct.	No.	Pct.
B732	Teton x X247-24	83	1	1.2	0	0
B733	Gr. Mt. x B24-76	661	14	2.1	0	0
B734	Gr. Mt. x X247-44	523	9	1.7	2	0.4
B748	White Rose x B24-58	662	42	6.3	19	2.9
B756	B24-238 x 96-56	516	27	5.2	5	1.0
B774	X750-10 x Katahdin	127	3	2.4	1	0.8
B775	X792-32 x B24-58	107	10	9.3	0	0
B777	X792-88 x Teton	412	1	0.2	0	0
B784	X1276-48 x B24-58	271	65	24.0	24	8.9
B785	X1276-48 x X247-44	452	43	9.5	14	3.1
B787	X1276-185 x Katahdin	146	8	5.5	1	0.7
B790	X1276-185 x X247-44	262	20	7.6	4	1.5
B796	Houma x Katahdin	399	32	8.0	3	0.8
B798	X247-42 x X247-44	342	17	5.0	4	1.2
B799	X750-10 x 46952	329	79	24.0	24	7.3
B800	46952 x X247-44	247	7	2.8	3	1.2
B808	Triumf x Katahdin	170	12	7.1	0	0
B809	Triumf x X247-48	205	36	17.6	2	1.0
B810	Houma x Shamrock	298	49	16.4	4	1.3
B817	Houma x Triumf	611	115	18.4	23	3.8
B819	Houma x X247-48	600	60	10.0	5	0.8
B820	Houma x 336-144	402	8	2.0	0	0
B1135	X247-24 selfed	289	2	0.7	1	0.4
B1136	X247-42 selfed	372	21	5.6	8	2.2
B1137	X247-48 selfed	264	1	0.4	0	0
B1138	Katahdin selfed	226	0	0	-	-

Maine table 5. Reactions of Progenies of Different Crosses to Leafroll Infection, resulting from Artificial Inoculations with Viruliferous Aphids in Each of Three Successive Seasons

Pedigree	Parentage	Seedlings in progeny 1945	Replanted 1947	Replanted 1946	Surviving 3rd inoculation and saved for possible use as parents	
					No.	Pct.
B572	Katahdin x X247-30	683	4	182	1	0.2
B573	Katahdin x X247-48	510	0	84	-	-
B575	Mohawk x X247-48	558	1	86	0	0
B577	Sequoia x X247-48	813	5	191	5	0.6
B578	Sebago x X247-48	701	1	77	1	0.1
B580	B24-76 x B61-3	400	2	45	0	0
B582	X247-24 x B24-58	302	29	122	5	1.7
B583	B24-78 x X247-24	257	34	104	8	3.1
B584	X247-30 x X247-42	364	15	124	8	2.2
B585	X247-3 x 46952	166	2	50	0	0
B586	528-194 x B24-58	199	3	58	1	0.5
B672	627-103 x B24-238	174	1	41	0	0
B673	B24-58 x X247-24	629	89	317	20	3.2
B1122	X247-24 selfed	347	17	114	6	1.7
B1128	X247-30 selfed	704	38	277	13	1.9
B1129	X247-48 selfed	830	4	156	0	0

MARYLAND, Cont'd. from page 49

by Houma and Md. 13-129. Since seedling Md. 13-129 which is a Sebago Earlaine cross has significantly outyielded Irish Cobbler for 3 successive years and since it matures as early and is much smoother, it may prove to be a valuable early-maturing variety for Garrett County. This is the first time in 6 years that Houma has significantly outyielded Irish Cobbler and it must therefore be considered to be a poor yielder in normal seasons. Although Marygold did not significantly outyield Irish Cobbler, it yielded significantly as high as Houma and seedling Md. 13-129. Since it has significantly outyielded Irish Cobbler in 3 out of 5 years it continues to be one of the most promising early-maturing varieties. Katahdin and Chippewa are also good early-maturing varieties. This is the first time that a yield record has been obtained from the scab resistant seedling B61-3. Although it did not yield significantly more than Irish Cobbler it did yield significantly as well as Marygold and seedling Md. 13-129. Only further studies can determine its value for planting in Maryland.

Adjacent to the plots sprayed with Bordeauz mixture and DDT 11 varieties and 8 seedlings were planted in 4 randomized replications in a field that was sprayed with 50% wettable DDT with no Bordeaux mixture in order to study comparative yields and susceptibility to late blight and other diseases. Both early and late blight were found in this field during July. A slight amount of early blight wad found in seedlings 672-5, B98-7, and B112-17, a medium amount in Potomac, Sebago, Sequoia and Calrose and in seedlings B8-3 and ERB-2, and much in Mason Smooth Rural, Russet Rural, Pontiac and seedling B164-15. A trace of late blight was found in seedling ERB-2, a slight amount in Calrose, Sebago, Sequoia, Potomac and seedlings 672-5 and B164-15 and a medium amount in Mason Smooth Rural, Russet Rural and seedlings B98-7 and B112-17. The largest yields were obtained from Sequoia with 429 bushels of U. S. No. 1 potatoes per acre, Pontiac with 400 bushels and Potomac with 387 bushels. However, Sequoia was the only variety that yielded significantly 1/ more than Mason Smooth Rural, but Pontiac, Potomac, Russet Rural, Sebago, Calrose, Teton, Marygold and seedlings B164-15, B73-7, B73-18, 672-5, B112-17 and B8-3 yielded significantly as well. All of the late-maturing varieties yielded more when Bordeaux mixture was used with DDT than when it was used alone, but the earlier maturing varieties, Marygold, Katahdin, Irish Cobbler, and seedling B73-18 yielded more when DDT was used without Bordeaux mixture. In 1946 all varieties yielded more when Bordeaux mixture was used with DDT than when it was used alone. It is not believed that these results warrant the omission of a fungicide in spray material applied to potatoes in western Maryland.

An important potato-growing area is located in the eastern portion of Washington County and the western part of Frederick County in the Wolfsville-Smithsburg area. In this area the elevation is 1,000 to 2,000 feet above sea level. Work on testing the newer disease-resistant and high-quality varieties and seedlings was begun in this area in 1946 and continued in 1947. Eleven varieties and seven seedlings were planted in 5 randomized replications in a farm near Chewsville. Seedling B73-18 yielded 424 bushels of U. S. No. 1 potatoes which is significantly 2/ more than any other variety or seedling. The next largest yields were obtained from Bliss Triumph with 338 bushels, Marygold

---

1/ A difference of 46 bushels is significant at a 5% point.

2/ A difference of 49 bushels is significant at a 5% point.

with 328 bushels, seedling B73-7 with 320 bushels, and Pontiac with 295 bushels. The lowest yields were obtained from seedlings B98-7 and B127-8 and from Potomac, Green Mountain, and Sequoia. In 1947 the largest yields were obtained from the earlier maturing varieties, but in 1946 the largest yields were obtained from the later maturing varieties. In 1947, the two seedlings with reputed baking quality equal to Netted Gem, seedlings B73-18 and B73-7 were among the highest yielding varieties. In tests conducted in Maine both of these seedlings have been reported to be very resistant to late blight. During both seasons the plots received 5 applications of Bordeaux mixture 4-4-50 plus 1 pound of 50 % wettable DDT.

Tests for the eastern part of the State were made at Pocomoke, Md., where the elevation is almost at sea level and where two crops are grown during the season. For tests with the early crop 17 varieties and 5 seedlings were grown in 5 randomized replications. The field was sprayed 5 times with Bordeaux mixture 4-4-50 plus 1 pound 50% wettable DDT. The largest yield was obtained from Marygold with 397 bushels of U. S. No. 1 potatoes per acre, followed by seedling Md. 13-129 with 372 bushels, Katahdin with 369 bushels, and seedling B73-2 with 359 bushels; all yielding significantly 1/ more than home-grown and Maine-grown Irish Cobbler, Sebago, Pontiac, Houma, Kasota, Earlaine #2, Chippewa and seedlings B61-3 and B77-1 all yielded significantly as well as home-grown and Maine-grown Irish Cobbler. The poorest yields were obtained from Red Warba, Bliss Triumph, Warba, Mesaba, Menominee, and seedling B87-1. For the sixth consecutive year the yield from Marygold has been as large or larger than any other variety or seedling included in the tests, for the fourth consecutive year seedling Md. 13-129 has yielded significantly better or as well as Irish Cobbler, and for the second consecutive year seedling B73-2 has yielded significantly better than Irish Cobbler. B73-2 is another blight-resistant seedling that has superior baking quality.

A late potato plot was planted at Pocomoke, Md., using seed of the 1946 season which was kept in home storage from the time it was harvested until April 1 and then kept at 40° F. until a few days before planting. Eleven varieties and 10 seedlings were planted in 5 randomized replications. A drought late in the season made conditions less favorable for the late potato crop than for the early crop. The largest yields were obtained from seedling B73-18 with 274 bushels of U. S. No. 1 potatoes per acre and seedling B73-7 with 215 bushels. Seedling B73-18 is the only variety in the test that significantly 2/ outyielded Dakota Red. Only two seedlings, B112-17 and B94-9, yielded significantly less than Dakota Red. The only conclusion that can be drawn from this test is that seedlings B73-18 and B73-7, which are both excellent bakers and are highly resistant to late blight, are very promising for planting as a late crop on the Eastern Shore. The fact that seedling B73-7 was also among the highest yielding varieties in the early crop makes this seedling exceedingly promising.

Another late potato plot was planted at Pocomoke using seed which was dug from the early crop, and treating it with various chemicals to break its dormancy. As a result of tests which have been conducted for many years, several chemicals have been found which will break the dormancy of early-grown potatoes so they can be used to plant the late crop. Response of the different varieties and seedlings to the same treatment has been found to vary greatly. In 1947

1/ A difference of 54 bushels is significant at a 5% point.
2/ A difference of 66 bushels is significant at a 5% point.

Marygold, Irish Cobbler, and seedlings B61-3, B73-2, B77-1 and Md. 13-129 were included in the tests. Stored Marygold potatoes from the previous season yielded 170 bushels of U. S. No. 1 potatoes per acre, stored Dakota Red 150 bushels, and stored Irish Cobbler 149 bushels. Marygold tubers harvested July 18 and planted July 23 after soaking the cut seed pieces in a 1% solution of ethylene chlorhydrin for one hour also yielded 170 bushels of U. S. No. 1 potatoes per acre, and the yield from similar seed soaked 10 minutes in a 1% solution of ammonium thiocyanate with enough Dithane Z-78 added to make a 1% solution yielded 159 bushels. Other treatments which gave yields significantly 3/ as large as stored Marygold were ammonium thiocyanate 1%, 10 minutes, and sodium thiocyanate 1%, 10 minutes.

Yields from treated seedlings B61-3, B73-2, and B77-1 were all significantly less than yields from stored seed but the yield from seedling Md. 13-129 treated 1 hour with a 1% solution of ammonium thiocyanate was significantly as large as the yield from stored Marygold seed. (134 bushels of U. S. No. 1 potatoes per acre)

3/ A difference of 42 bushels is significant at a 5% point.

Michigan

E. J. Wheeler and H. C. Moore

In 1947 Michigan experienced the wettest spring in years followed by extreme drought and high temperatures. As a result, potatoes were planted later than usual. The tuber size was small and yield reduced. Even with these adverse conditions, the potato seedlings grew very well and real progress was made in obtaining increase for further testing in 1948.

Approximately 8,000 seedlings were grown from true seed representing some 45 crosses involving selected parents. Most of the parent material contained scab resistance. These seedlings were grown on a soil affected uniformly with the scab organism. Over 200 seedlings were selected for yield, tuber type, and resistance.

The routine of growing seedlings was similar to other years so we are confining our report to the performance of seedlings and varieties of merit selected by us and others in the National Potato-Breeding Program. The Katahdin variety in Michigan was doomed because of the presence of ring rot. Two years ago foundation seed was obtained from Canada. Now we have considerable seed available for distribution and should again proceed with this adopted variety. The Sebago variety is becoming very popular with the growers because of its whiteness after boiling, high dry-matter content, mild scab, and lots of blight resistance.

Potato scab in Michigan on most susceptible varieties makes deep-pitted scab on the tubers. The Sebago variety under similar conditions has scab only on the surface and only slightly raised.

Potato growers who have been irrigating have high praise for the Sebago variety because of the high yields of excellent tuber type. In 1948 it will be

grown by more growers using irrigation. Tests conducted on muck by growers where late blight was present are enthusiastic and will plant more of the Sebago variety in 1948. If the muck is in small patches and well enough drained the lateness of the Sebago can be overcome by early planting.

Seedling No. 125-4 was tested by growers in all sections of Michigan. This seedling is only a few days later than the Irish Cobbler. It is one of the highest early-maturing seedlings we have tested in Michigan. Seed of this seedling planted early in May was mature by August 20. It produces larger tubers with shallower eyes than the Irish Cobbler. Comparing yield tests under irrigation, Irish Cobbler gave a yield of 363 bushels per acre when seedling No. 125-4 yielded 647 bushels per acre.

The bushy type vine and the early maturity are favorable for harvesting with a mechanical harvester. One grower easily harvested 2 acres of seedling No. 125-4 with a harvester. Under similar soil conditions, machine harvesting was impossible with the Russet Rural, Sebago, and Menominee varieties.

Table 1. Density data of 6 seedlings grown on muck in 1946 and 1947 in comparison with Chippewa and Katahdin.

	1/ Density Class Mean	
	1946	1947
B79-2	3.2	3.4
B73-18	4.3	4.5
527-7	3.9	3.5
28-3	4.7	3.5
B151-7	4.6	2.7
468-2	2.8	3.0
Chippewa	2.2	1.0
Katahdin	2.2	1.8

1/ The highest density class mean possible is 5.

Selected seedlings for high density were grown on muck in 1946 and 1947 in comparison with the standard muck varieties Chippewa and Katahdin. Density readings in 1947 compare favorably with those of 1946. (Mich. table 2) Scab resistance and high density are two factors necessary for a good variety grown on muck soils.

Mich. Table 2. Yield and Late Blight Test on Muck Soil

Variety or Seedling	Total Yield per Acre	U.S. No. 1	Rot (Late Blight)
	Bushels	Per Cent	Per Cent
53-11	319	87.5	3.2
125-4	516	88.5	5.2
Chippewa	491	92.2	17.3
Sebago	551	90.2	1.2
Menominee	574	95.0	13.8
Warba (Pink eye)	329	83.4	17.4
(2) 25	545	75.5	0.7

(1) Yield test in cooperation with Dr. Paul Harmer and Dr. J. F. Davis of the Soil Science Department.

(2) Dr. Donald Reddick AFY-5 seedling.

The percentage of rot which was due to late blight shows the high resistance of Sebago, seedling 25, 125-4 and 53-11. (Mich. table 2). Sebago and Warba varieties gave the best cooking quality, whereas seedling 53-11 and 25 were very soggy.

Seedling No. B70-5 gives a high yield, but will be limited to areas where scab is not a problem. It competes very well with Green Mountain in the Upper Peninsula. Seedling 529-1 is early to medium maturity showing considerable scab resistance. This is to be increased for further testing.

Five-hill plots of all the seedlings selected at the Chapman Farm in Maine were grown at Rogers City in 1946. Many of these seedlings gave a high yield of excellent type tubers. The better seedlings are to be increased in 1948 and a supply should be available for distribution in 1949. Many of these seedlings showing scab resistance will be grown on farms in counties where county agricultural agents have requested them.

M I N N E S O T A

F. A. Krantz, Carl J. Eide and C. O. Turnquist

The potato-breeding program has been principally concerned with improvement in adaptation, market, and table quality, and in resistance to scab, late blight, and virus diseases. Research studies are in progress on efficient techniques of selection for the above characters. Entire seedling families are being tested over a number of years for specific characters. Individual selections are made at different stages of the study and comparative tests made with the entire seedling population from which they were drawn.

Another study is concerned with the evaluation of clones intended for use as parents. The data for the past 25 years indicate that most of the improvement traces through a relatively small number of clones. The records show that these clones were given a high ranking in the early stages of testing but that their importance was not fully appreciated until 6 to 10 years after the initial selection. Perhaps a more intensive testing of clones, intended for use as parents, for their adaptation, market and table quality would have increased the efficiency of the breeding program. Many of the best parents obtained in outcrossing were selections that were initially placed in the adaptation tests to determine their possible value as commercial varieties.

Late Blight

The effectiveness of selection based on tuber tests for resistance to late blight was studies in a cross of resistant X susceptible. The family consisted of 152 seedlings, 22 of which in the second clonal generation gave no tuber infection after tuber inoculation. Both vine and tuber readings were obtained on 18 of the 22 seedling clones the following year. Both vines and tubers were resistant in 16 seedlings and susceptible in two seedlings. In this family the association between tubers and vines for resistance to late blight permitted effective selection on the basis of tuber resistance.

Scab

The behavior of seedling clones from parent combinations having different degrees of scab resistance is given in table 1. A fairly good association is indicated between the degree of resistance in the parents of the cross and their seedling clones in the mean scab index and in the percentage of clones with a scab index of 2 or less. There was a wide variation within groups of crosses having parents with a similar mean index. As shown in table 2, part of this variation was due to the greater resistance found in crosses where the two parents came from different resistant ancestors than when both parents were descended from one resistant ancestor.

Named Selections

Three selections have been named with the intention of introducing them in 1948. The performance of these selections (Waseca, Chisago and Satapa) in 1947 is given in Minn. tables 3, 4 and 5 and their mean performance for a 5-6 year period is given in Minn. table 6. It will be noted that the major improvement is in market quality and in a lower proportion of tubers under 1 7/8" in diameter.

Minn. table 1. Behavior of clones from parent combinations having different degrees of resistance to scab.

Parent Combination	Crosses	Seedlings	Clones tested	Scab	Clones with index of 2 or less
Scab index	No.	No.	No.	Index	Percent
2 with 3	6	595	40	2.86	42.5
3 with 3	21	3268	214	3.47	16.8
2 with 5	8	784	67	3.43	14.9
3 with 5	4	566	47	3.86	6.4

Minn. table 2. A progeny comparison of parental resistance to scab obtained from one, and from two resistant ancestors.

Source of Resistance	Parent Combinations	Crosses	Clones tested	Scab	Clones with index of 2 or less
Varieties	Scab index	No.	No.	Index	Percent
H and J	2 with 3	2	29	2.56	48.3
J and J	2 with 3	2	10	3.33	20.0
H and J	3 with 3	7	115	3.30	18.3
H and A	3 with 3	3	32	3.36	28.1
A and J	3 with 3	1	8	3.00	37.5
H and H	3 with 3	9	36	3.69	5.4

Minn. table 3. Performance of potato varieties in the Red River Valley, 1947

Variety	Locations Tested	Yield	Tubers over 1 7/8" in diameter	Dry Matter	General Desirability 1/
	Number	Bushels	Per cent	Per cent	Rank
Extra Early					
Red Warba	5	205	89	21.4	2.1
Waseca	2	195	90	18.3	1.5
Minn. 42	5	178	89	20.4	1.6
Minn. 23	5	176	95	19.1	2.5
Early					
Cobbler	5	212	86	22.3	2.5
Triumph	5	169	89	20.2	2.4
Chisago	5	181	89	20.4	2.4
Medium Early					
Chippewa	5	177	85	20.0	3.1
Pontiac	5	180	89	18.9	2.1
Satapa	5	181	85	20.2	1.4

1/ Ranked in five classes. 1st, 2nd, 3rd, 4th, 5th.

Minn. table 4. Performance of potato varieties on peatland, 1947

Variety	Locations Tested	Yield	Tubers over 1 7/8" diameter	Dry Matter	General Desirability 1/
	Number	Bushels	Percent	Percent	Rank
Extra Early					
Red Warba	3	220	89	17.7	3.3
Waseca	3	226	90	16.6	2.5
Minn. 42	3	236	93	17.0	2.0
Minn. 23	3	208	94	15.5	3.3
Early					
Cobbler	3	235	86	18.3	3.3
Triumph	3	235	87	16.2	3.0
Chisago	3	225	92	17.2	2.2
Medium Early					
Chippewa	3	260	90	16.4	2.8
Pontiac	3	275	91	15.1	2.5
Satapa	3	258	91	16.4	2.5
Late					
Menominee	3	150	86	15.8	4.3

1/ Ranked in five classes 1st, 2nd, 3rd, 4th, 5th.

Minn. table 5. Performance of potato varieties in late region, 1947.

Variety	Locations Tested	Yield	Tubers over 1 7/8" in diameter	Dry Matter	General Desirability *
	Number	Bushels	Percent	Percent	Rank
Extra Early					
Red Warba	2	163	90	18.5	2.8
Waseca	2	199	83	16.2	2.2
Minn. 42	2	181	87	16.4	2.8
Minn. 23	2	200	89	16.4	2.5
Early					
Cobbler	2	282	87	18.5	3.2
Triumph	2	288	89	17.7	2.8
Chisago	2	235	94	18.1	2.2
Medium Early					
Chippewa	2	279	90	17.2	3.0
Pontiac	2	270	92	17.2	3.0
Satapa	2	240	91	17.4	1.1
Late					
Menominee	2	190	91	17.7	3.4

* Ranked in five classes 1st, 2nd, 3rd, 4th, 5th.

Minn. table 6. Performance of potato varieties in the Red River Valley, 1947.

Variety	Yrs. Tested	Mean Yield	U.S. No. 1 Tubers	General Superiority 1/
	No.	Bu.	Percent	Rank
Extra Early Group				
Red Warba	6	189	80	3.1
Waseca (Minn.35)	5	174	90	1.5
Early Group				
Irish Cobbler	6	193	77	3.0
Bliss Triumph	6	164	85	3.1
Chisago (Minn.47)	6	181	88	2.4
Second Early Group				
Chippewa	6	184	72	3.5
Pontiac	6	194	88	2.6
Satapa (Minn.50)	5	200	85	2.2

1/ Ranked in five classes 1st, 2nd, 3rd, 4th, and 5th.

MINNESOTA (Northeast Experiment Station)

M. J. Thompson

The data for the potato yield tests at the Northeast Experiment Station are given in Minnesota table 7.

Our men reported this block of potatoes was the best we had. I am particularly interested in the resistance to ring rot that Teton offers. Ring Rot and late blight are our present concern.

B 76-43 gave the highest yield. This seedling is highly resistant to late blight in the Maine tests as is also B 70-5, B 61-3, and B 69-16. B 70-5 is a widely adapted variety, usually with high cooking quality. It will probably be named in Maine in 1948.

Minnesota table 7. Yield data for potato varieties and seedlings tested at the Northeast Experiment Station, Duluth, Minn., in 1947.

Variety	Yield per acre salable tubers	Salable
	Bu.	Pct.
Mohawk	145	83
B 75-4*	124	89
B 76-23*	200	95
B 76-43*	340	92
Sequoia*	223	92
Menominee	108	90
Katahdin	181	89
Green Mountain	249	89
Sebago	186	87
Teton	279	97
B 70-5	215	87
B 61-3	242	93
Chippewa	255	89
B 69-16	186	95
Pontiac	227	98

* These potatoes were all planted in remote location; that is the whole block. During early fall, before digging time, rows 3, 4, 5, were partially dug by some unknown person.

N E B R A S K A

H. O. Werner

Horticulture Aspects

The Nebraska program has been conducted along essentially the same lines as those in 1946. The chief attainment in 1947 was finding more good-type early red tuber lines, establishing more information as to the degree of scab resistance in some relatively early lines that have red tubers and have good pollen. Ascorbic acid studies have been continued. Although the ascorbic acid content of tubers varies from season to season, most lines show consistency; some are always relatively high others always relatively low. The range of values for tubers of 128 selections or varieties, grown with irrigation at Scottsbluff and analyzed in 1947 within 2 weeks after harvesting, was from 11 to 42 mgs. ascorbic acid per 100 gms. fresh weight of tubers.

Practically all of the crosses being made this winter will be for the purpose of incorporating scab resistance into early lines producing red tubers and having high table quality.

Variety Yield Tests

Seven numbered selections were tested in comparison with some old standard and some new varieties. Anyone interested in details of testing procedures and description of geographical features of places where variety trials were conducted is referred to the 1946 report.

Climatic conditions were very favorable at Lincoln where the June rainfall was the highest on record for that month and most of July was unusually cool. The irrigated plot received only two irrigations one of which might better have been omitted because of subsequent heavy rains. Conditions were unusually favorable for growing potatoes at North Platte. The low yields in the dry land plot there were due to the impoverished condition of the soil. At Box Butte Experiment Farm near Alliance the soil was put into a very bad physical condition by a series of hard rains in June followed by a rainless summer. The Banner county plot was located on dry land at an altitude of 5,300 feet close to the Wyoming line.

Promising Varieties that are New or in Advanced Status.

Kasota deserves more consideration for commercial production in western Nebraska. This is the eighth season during which it has been tested intensively in the field throughout Nebraska. Throughout this period it has produced practically as many potatoes per acre as the Triumph. However, in western Nebraska on both dry and irrigated land it has excelled the Triumph in the percentage of US#1 potatoes and yield per acre of US#1 grade. The tubers have been more desirable because of having eyes that are more shallow, absence of cracking at harvest time, smaller number of tubers out of grade because of secondary growth, slightly less susceptibility to scab, distinct resistance to fusarium wilt, and a slightly higher ascorbic acid content. The specific gravity and cooking quality of the two varieties are very similar. The color is not as dark as that

of the Triumph so some merchandising effort and ingenuity might need to be exerted to get this variety established on the market. Last year return postal cards, on which multiple choices for seven factors were listed, were placed in a carload of 10-pound consumer bags. The almost unanimous and generally quite enthusiastic replies received indicated the acceptance of this variety by consumers.

Nebraska 3 (Neb. 24.38-3 from USDA 0123X Minn. 41.1-1-7-6-1). This is a dark red tuber selection which was increased sufficiently in 1947 to provide seed for an acreage that should produce 35 to 50 carloads of potatoes in 1948, after which it will be named and released or be dropped. The Nebraska Certified Potato Growers Cooperative is increasing this stock and through their Foundation Seed Department is developing seed stock of foundation quality.

This selection produces tubers of darker red color than those of the Triumph. The tubers are smoother, have more shallow eyes, and are generally smaller than those of the Triumph. The variety possesses some degree of resistance to both scab and fusarium wilt. Because of the heavy setting of tubers it is considered suitable only for the late western Nebraska areas. In field tests, in western Nebraska, covering four seasons with and without irrigation, the total production has been quite similar to that of Triumph. The percentage of US#1 potatoes has been about the same or better so that the yield of US#1 has generally been equal or greater than that of Triumph. It produces fewer rough and scabby tubers and the tubers do not crack at harvest time. The cooking quality is about like that of Triumph. This is not likely to be a variety that will remain for a long time but if it produces more #1 potatoes than the Triumph it will be a good stop-gap variety until early red varieties with scab resistance are available.

Nebraska 2 (SND-48-2, Warba and Katahdin). This is an early white variety that produces tubers of good block type and that are unusual for uniformity of size and shape. The total yields are generally less than those of Red Warba or Irish Cobbler, the varieties it would probably replace in early potato areas, but because of the very high percentage of US #1 potatoes it yields more of this grade than do those varieties. The cooking quality is similar to that of Cobbler and superior to Red Warba. Unfortunately it is very susceptible to scab, but probably no more so than Red Warba or Cobbler. Growers who have seen this variety are impressed by the superior market appearance and quality of the tubers. This variety is being planted in several large fields in several parts of the state this year.

Comments Concerning other Lines in Yield Tests.

71.39-3 is a long white segregate that is being dropped because of poor keeping quality, sun greening of tubers, poor stands and scab susceptibility.

60.37-9 (Cobbler X Minn. 5.33). White midseason too early, light set. Very high yields in irrigated fields of central Nebraska.

97.41-1 Is a pale to medium red that possesses some resistance to fusarium and scab. It may be useful as a parent but probably not a variety.

85.41-1 Very pink tubers of very good type that seems to have considerable scab and fusarium resistance.

SND11-8 Produces red tubers that are smooth but too small, rough and susceptible to scab. It may have breeding value because of some fusarium resistance in a red tuber.

The yields in bushels per acre of U. S. No. 1 A tubers produced by 9 varieties and 7 numbered seedlings grown in six locations in Nebraska in 1947 are

given in Nebraska table 1. As a mean for all locations and harvests Katahdin ranked first in yield, seedling No. 60.37-9 was second, Pawnee was third, and Red Warba fourth. Nebr. table 2 gives the percentage of No. 1 A tubers produced by each variety at each trial point. The specific gravity readings for the various tests are given in Nebr. table 3, and the ascorbic acid data in Nebr. table 4.

The Banner County tests gave the highest specific gravity for all varieties. The mean for the 16 varieties was 1.0860. The lowest was found in the Lincoln irrigated plots (1.0576). If 1.080 is taken as the lower limit for a mealy potato, all varieties would be considered mealy in the Banner County tests, and only one of them (SND 48-3) which was right on the border-line could be considered in the mealy class.

The ascorbic acid content varied greatly among varieties, locations, and harvests. In all but a few cases there was a loss in ascorbic acid after the tubers were held in storage 2 or 3 weeks. The losses varied greatly with varieties, locations and harvests.

Nebraska table 1. Bushels per acre of No. 1 A size tubers produced by each variety at each trial point in Nebraska in 1947.

Variety No.	Name	Lincoln					Gibbon	North Platte			Box Butte Exp. Farm			Scottsbluff			Banner County	Mean
		Dryland				Irrig.	Irrig.	Dry-land	Irrigated		Dryland			Irrigated				
		Early Harv.		Late Harv.					Early	Late	June 7	June 16	June 26	June 6	June 16	June 26		
		Spray	Not Spray	Spray	Not Spray													
		Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.
1	Triumph	211	179	260	154	385	152	67	307	341	18	10	62	160	202	317	102	183
2	Red Warba	253	272	296	245	489	236	59	333	380	21	4	25	65	64	261	128	196
3	I.Cobbler	218	199	253	234	392	192	66	388	383	15	6	24	76	161	262	107	186
4	Pawnee	246	252	220	215	342	223	60	343	321	49	18	64	222	188	299	114	198
5	Kasota	169	233	182	179	346	225	49	282	344	26	12	46	225	205	361	72	185
6	Katahdin	234	210	297	230	390	330	69	374	441	25	10	52	191	201	299	105	217
7	SND48-2	219	207	266	214	393	173	52	311	355	50	10	77	189	196	288	93	193
8	24.36-3	100	115	96	113	167	235	43	272	295	40	14	63	249	196	301	92	149
9	71.3[illegible]-3	113	60	74	81	224	61	36	199	197	23	4	34	115	102	193	91	101
10	60.37-[illegible]	222	175	306	274	399	207	72	405	455	44	6	50	186	98	198	107	200
11	97.41-1	189	131	258	163	318	345	49	300	288	16	10	38	239	170	258	95	179
12	85.41-1	179	163	250	189	262	224	28	243	273	28	6	39	127	129	214	99	153
13	SND11-8	162	248	198	173	286	203	42	294	291	14	3	29	178	131	204	50	157
14	Teton	167	82	225	169	294	238	56	285	298	33	9	32	217	206	284	108	169
15	Menominee			110	99	277	221	60	207	274	10	3	12	101	64	95	63	114
16	Sebago			150	113	286	254	47	278	444	3	1	8	36	65	65	20	126
	MEAN	191	180	215	178	328	220	53	302	336	26	8	41	161	150	244	90	169

Nebraska table 2. Percentage of No. 1 A size tubers produced by each Variety at each trial point in Nebraska in 1947.

Variety No.	Name	Lincoln Dryland Early Harv. Spray	Lincoln Dryland Early Harv. Not Spray	Lincoln Dryland Late Harv. Spray	Lincoln Dryland Late Harv. Not Spray	Lincoln Irrig.	Gibbon Irrig.	North Platte Dry-land	North Platte Irrig. Early	North Platte Irrig. Late	Box Butte Exp Farm Dryland June 7	Box Butte Exp Farm Dryland June 16	Box Butte Exp Farm Dryland June 26	Scottsbluff Irrigated June 6	Scottsbluff Irrigated June 16	Scottsbluff Irrigated June 26	Banner County Dryland	Mean
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1	Triumph	53	59	60	52	70	42	79	87	85	14	12	44	41	52	69	73	56
2	Red Warba	65	72	67	76	76	51	85	90	90	19	6	18	15	16	58	76	55
3	I.Cobbler	55	66	64	65	76	47	82	94	86	11	6	18	17	40	64	67	54
4	Pawnee	71	74	69	70	71	60	84	92	88	39	24	50	58	50	75	79	66
5	Kasota	60	63	64	68	71	67	80	87	88	24	19	45	59	59	82	71	63
6	Katahdin	67	75	75	82	80	76	85	92	87	31	20	56	56	60	84	72	68
7	SND 48-2	68	75	81	76	71	45	82	88	87	52	22	68	56	53	70	78	67
8	24.38-3	35	34	26	40	31	54	56	77	75	34	18	48	60	47	67	71	48
9	71.39-3	59	55	39	45	58	47	74	83	75	23	11	40	33	34	64	71	51
10	60.37-9	83	87	87	87	82	51	87	96	89	42	18	56	50	32	63	79	68
11	97.41-1	64	69	67	64	60	78	74	82	76	23	30	52	67	63	78	81	64
12	85.41-1	63	70	67	63	61	61	68	79	80	41	17	47	44	56	70	79	60
13	SND11-8	63	70	63	62	62	53	72	86	83	26	9	41	54	43	56	57	56
14	Teton	53	57	68	67	64	70	72	84	75	33	15	31	68	64	75	76	61
15	Menominee			61	66	62	76	76	76	55	18	12	23	38	45	64	61	54
16	Sebago			74	77	68	75	79	86	84	18	7	33	62	59	68	59	61
	Mean	61	66	64	66	66	59	77	86	81	28	15	42	50	48	69	72	59

Nebr. table 3. Mean Specific Gravity of #1 A size potatoes of each Variety at the various trial points in Nebraska in 1947

Variety #	Name	Lincoln					Gibbon	North Platte			Box Butte Ex. Farm			Scottsbluff			Banner County	Mean
		Dryland				Irrig.	Irrig.	Dry-land	Irrigated		Dryland			Irrigated				
		Early Harv.		Late Harv.					Early-Late		June 7	June 16	June 26	June 6	June 16	June 26		
		Spray	Not Spray	Spray	Not Spray													
1	Triumph	54.1	53.6	56.3	54.1	56.4	71.5	71.7	69.8	72.5	72.9	69.3	75.1	81.3	78.3	80.7	87.5	69.1
2	Red Warba	66.0	68.2	70.3	65.0	59.6	74.3	81.1	74.7	81.8	75.2	72.4	75.8	77.1	75.4	81.6	88.6	74.2
3	I.Cobbler	68.1	69.5	73.5	70.1	64.9	78.3	81.1	78.3	82.5	81.0	79.4	83.9	82.8	80.4	83.5	90.3	78.0
4	Pawnee	64.1	65.2	65.8	61.9	61.2	75.2	78.2	74.2	83.8	74.6	75.6	79.6	80.3	80.8	85.1	88.6	74.6
5	Kasota	70.0	69.3	73.3	68.1	58.7	74.3	73.1	67.6	75.8	72.1	69.1	74.5	78.5	74.8	78.6	81.9	72.5
6	Katahdin	55.1	51.1	54.5	53.7	46.0	70.2	61.4	61.4	66.2	70.5	73.9	75.7	82.0	84.1	85.1	89.9	67.5
7	SND48-2	69.8	69.4	74.9	66.7	80.3	80.3	81.3	76.9	82.6	77.3	77.6	80.2	80.7	79.6	85.6	89.0	77.6
8	24.38-3	61.8	64.0	65.6	59.3	63.3	70.8	67.2	70.8	71.9	74.2	72.3	78.8	82.5	80.7	81.7	85.0	71.9
9	71.39-3	69.3	72.3	74.9	62.3	69.0	67.0	70.8	73.4	77.4	77.2	73.5	77.3	83.5	83.3	82.2	88.5	75.1
10	60.37-9	63.5	63.7	60.2	60.0	52.1	66.9	65.2	67.0	70.4	70.4	69.6	72.4	68.4	75.7	81.8	82.2	68.1
11	97.41-1	59.7	56.6	49.8	49.6	55.7	68.2	64.8	66.3	66.0	68.8	66.0	72.7	72.8	72.2	72.4	82.9	65.3
12	85.41-1	67.4	65.6	64.1	63.5	63.6	69.3	75.3	69.1	65.5	74.4	74.3	75.5	76.5	76.0	77.5	80.8	71.1
13	SNDLL-8	67.8	69.6	68.7	67.4	66.9	84.8	73.2	77.9	79.4	68.6	73.4	76.1	85.7	82.8	89.2	82.8	75.9
14	Teton	60.0	56.7	57.5	55.0	49.1	62.0	70.3	63.0	65.0	68.9	69.9	73.1	78.0	77.4	77.6	84.8	66.8
15	Menominee			50.2	48.4	46.3	64.0	65.5	60.1	67.5	66.4	63.7	64.0	77.8	72.8	74.1	85.5	64.7
16	Sebago			42.1	43.1	38.6	52.9	54.7	56.4	64.9	62.7		69.3	75.5	76.5	72.9	88.4	61.4
	Mean	64.1	63.9	62.6	59.3	57.6	70.6	70.9	69.2	73.3	72.2	72.0	75.2	79.0	78.2	80.6	86.0	70.9

Nebr. table 4. Milligrams of Ascorbic Acid per 100 grams of fresh weight of tubers analysed shortly after harvest and 2 or 3 weeks later, in 1947 potato variety trials (each value is a mean based on analysis of 4 lots of 4 tubers at each date.

Variety or Number	Lincoln Dryland Early Harv. Not Spray	Lincoln Dryland Early Harv. Spray	Lincoln Dryland Late Harv. Not Spray	Lincoln Dryland Late Harv. Spray	Lincoln Irrig.	Gibbon Irrig.	North Platte Dry. Irrigated Early Harv.	North Platte Dry. Irrigated Late Harv.	Box Butte June 27	Scotts Bluff June 27	Banner County June
1 Triumph	43.4	40.8	38.6	41.3	23.4	37.5	40.7	35.6	28.7	37.4	26.1	39.6
	32.0	32.2	36.1	33.6	19.8	33.7	36.5	36.6	26.8	26.2	22.6	29.1
2 R.Warba	41.8	39.6	43.7	32.3	23.8	31.0	35.4	31.3	25.5	31.9	26.3	34.1
	34.2	33.6	35.6	32.3	17.4	26.0	32.7	31.4	20.7	24.4	21.6	28.7
3 I.Cobb.	38.1	40.7	43.8	36.7	24.4	31.3	38.8	35.9	25.8	35.5	24.4	36.4
	33.2	40.4	38.5	40.9	21.2	28.4	34.3	30.9	23.8	26.1	20.6	31.0
4 Pawnee	35.3	33.9	35.1	32.8	20.0	28.0	34.0	27.4	29.3	32.0	27.0	34.4
	31.6	31.7	38.6	32.0	18.0	26.4	31.0	27.1	23.0	24.3	24.8	30.0
5 Kasota	47.5	49.7	39.5	38.6	22.6	40.9	45.4	47.0	34.7	41.6	24.7	36.7
	50.0	44.5	37.9	35.8	21.2	40.4	40.3	40.5	30.9	30.3	20.1	34.6
6 Katah-din	30.2	27.2	21.2	19.5	19.5	28.8	33.5	34.8	28.2	35.7	25.7	33.0
	30.1	26.9	21.6	19.2	16.0	28.2	31.5	30.9	26.7	27.7	16.9	30.0
7 Neb. 2	43.8	39.1	48.5	39.1	24.6	33.1	38.5	38.6	28.4	35.1	28.7	35.9
	38.6	35.5	40.4	32.7	18.8	29.9	36.7	35.4	24.6	27.5	24.3	29.9
8 Neb. 3	32.8	33.5	27.8	23.3	33.9	27.8	36.6	35.8	27.6	36.1	27.8	38.1
	33.9	30.5	24.8	18.6	20.2	27.4	31.8	32.5	23.1	28.3	23.8	31.0
9 71.39 -3	28.4	25.9	22.7	18.6	24.3	25.2	33.0	31.8	23.5	32.8	25.8	34.2
	23.9	22.1	18.6	16.6	19.1	22.8	29.6	29.3	21.5	22.9	24.2	29.4
10 60.37 -9	39.6	31.1	27.1	27.6	20.7	31.9	40.0	39.6	29.4	43.4	27.5	45.8
	31.7	30.5	25.7	26.3	22.3	28.6	37.7	36.0	21.2	31.4	23.5	39.0
11 97.41 -1	20.0	17.3	15.8	14.6	16.8	18.4	24.2	23.8	22.8	27.8	22.0	29.5
	19.3	16.0	14.1	11.9	12.8	19.2	23.1	20.7	18.0	22.8	18.2	22.7
12 85.41 -1	36.4	35.1	37.7	35.6	22.3	33.4	30.9	30.5	23.5	32.3	29.3	33.9
	34.9	31.7	36.1	30.6	17.4	27.5	28.9	28.7	18.8	21.8	22.8	25.9
13 SND11 -8	34.0	30.8	23.8	22.7	19.8	25.0	24.9	26.3	23.6	38.2	32.8	33.4
	32.3	31.4	21.6	20.4	15.7	21.3	22.4	26.7	17.9	30.1	28.5	29.4
14 Teton	22.5	17.3	15.7	14.6	12.9	20.2	25.3	24.5	24.7	28.7	20.8	27.9
	19.9	17.9	14.3	13.4	11.8	20.0	21.8	21.1	18.7	19.7	16.9	24.2
15 Meno-minee			16.7	14.8	14.9	28.7	23.1	28.4	24.3	32.9	23.8	24.7
			14.7	15.8	14.4	23.5	22.8	24.4	20.2	23.1	17.7	18.6
16 Sebago			16.9	20.3	19.4	28.0	27.1	29.6	25.3	32.9	22.5	23.8
			16.0	16.6	15.0	25.9	26.2	26.7	21.9	26.1	19.3	20.7

NEW JERSEY

John C. Campbell

This year we obtained the highest yields ever recorded in any of our trials and also the highest yields even officially measured anywhere in the State in our variety test conducted on the farm of Oscar Ketchum, Jr., at Freehold. Record yields were produced by Chippewa 1-46, a strain developed and donated by Stark Farms, Rhinelander, Wis.; and Teton, a variety resistant to ring rot, secured from L. G. Tarbox of Ulysses, Pa., and developed jointly by the U.S.D.A. and the Experiment Stations of Wyoming and Maine. These varieties produced the exceptionally high total yields of 754 and 752 bushels per acre, respectively. N. J. table I. Two other varieties, namely, Irish Cobbler, secured from C. E. Hussey and Sons of Presque Isle, Maine, and Ontario, a scab-resistant variety recently developed jointly by the U.S.D.A. and Cornell and secured from Robson Seed Farms of Hall, N. Y., produced the outstanding yields of 742 and 740 bushels per acre, respectively. Nine other varieties or strains of varieties, 6 of them from Stark Farms, produced yields ranging from 602 to 690 bushels per acre, whereas the lowest yield recorded was 488 bushels per acre. Exceptionally fine weather and the use of DDT in the spray undoubtedly were major factors in the production of these exceptionally high yields. Mr. Ketcham plowed under a wheat cover crop and 1,000 pounds per acre of a 4-12-8 fertilizer in the spring, 1,200 pounds of which was applied in bands when he planted the seed.

Among the newer varieties tested Erie, an Ohio and U.S.D.A. development, produced 602 bushels per acre, ranking 13th among the 21 lots, whereas Pawnee and Mohawk produced the lowest yields, namely 515 and 488 bushels per acre, respectively. These two varieties have shown considerable promise in previous tests and the Mohawk rated 12th among the 31 lots planted in the Middlesex County test this year on the Spencer Perrine farm at Cranbury and still must be considered a good yielding variety of exceptionally good cooking quality. The Pawnee made a rather disappointing showing in both tests when compared with the other varieties but the yields of 515 and 313 bushels per acre were not too bad when considered by themselves.

The test conducted in Middlesex County contained samples from most of these same lots of seed and in addition 10 lots that were not in the Monmouth County test. These were planted on the Spencer Perrine farm at Cranbury.

The highest yields in this test were produced by the Teton variety and a strain of the Katahdin variety, furnished by Dr. R. A. Johle, of the University of Maryland. Both of these varieties produced a total yield of 486 bushels per acre, however, 94.2 percent of the Tetons or 457.8 bushels were U.S. No. 1, whereas 90.4 percent of the Katahdins or 439.3 bushels were U.S. No. 1. The Ontario variety rated 2nd in total yield at Perrine's, producing 480 bushels per acre, however, only 82.4 percent or 395.5 bushels were U.S. No. 1 quality. Despite this fact the Ontario is an excellent variety for growers who are troubled with scab. This variety is rather late in maturing and the tubers not only possess a good appearance but are also of excellent quality. The Chippewa 1-46 strain from Stark Farms, which rated first in the Monmouth County test, rated fifth in total yield in Middlesex County, but second in yield of U.S. No. 1 with

a production of 446.5 bushels per acre. All of the Chippewa strains from Wisconsin outyielded the Chippewas from Maine in both tests by a rather large margin, and it would seem that these Wisconsin strains should be tested again to further prove their yielding ability. Some of these strains developed by Miss Stark were almost as early in maturing as the Cobbler, whereas others were later than most Chippewas.

The varieties that were tested in New Jersey for the first time include Marygold, Fillmore, Great Scot, and seedling X 1276-185. The Marygold variety was developed in Maryland in cooperation with the U.S.D.A. It has yellow flesh and medium shallow eyes, and rated tenth in yield, producing a total yield of 418 bushels per acre, 80.1 percent of which were U.S. No. 1. Fillmore is a blight-resistant variety, developed at Cornell, but produced the rather low yield of 269 bushels per acre, 90 percent or 242 bushels of which were U.S. No. 1. This variety will be tested again to obtain further information on its yielding ability. Great Scot is a variety grown in British Columbia, Canada, with considerable success and a sample was submitted for trial by E. R. Bewell of the Dominion Department of Agriculture. This variety produced a total yield of 339 bushels per acre with only 73 percent or 248 bushels U.S. No. 1. Since the sample submitted was quite small this test is not considered a fair trial of its yielding ability. If a nearer seed source can be located a larger sample will be tested in 1948. The seedling X 1276-185 is a leaf roll-resistant variety developed in Maine, and it produced a total yield of 403 bushels per acre, 351.4 bushels or 81 percent were of U. N. No. 1 quality. The Potomac and Menominee varieties, which are moderately resistnat to scab, have been tested before with only fair results, and their performance again this year was not outstanding. The Potomac produced a yield of only 159.7 bushels of U. S. No. 1 per acre, whereas the Menominee produced a yield of 321 bushels of U.S. No. 1 per acre. The Potomac variety has a rough skin and also has the tendency to produce growth cracks and second growth knobs. Two seedlings from approximately 3,000 that were originally obtained from the U.S.D.A. in 1942 were selected at the Experiment Station as being worthy of increasing to a point where they could be planted in a commercial field. These seedlings, B211NB2 and B312NB4, produced total yields of 323 and 301 bushels per acre, respectively, 93.7 percent or 303 bushels of seedling B211NB2 were U. S. No. 1, whereas 88.3 percent or 266 bushels of seedling B312NB4 were U.S. No. 1. These are rather disappointing yields in comparison with the others, and it may be that they will have to be discarded unless they show a marked resistance to late blight or some other disease. This only indicates the long and difficult road that leads to the development of a good new commercial variety.

NEW YORK

F. M. Blodgett, Wilson L. Smith, Jr., and Robert E. Wilkinson

---

Tests of scab-resistant potato seedlings were continued on four farms in 1947. In general, it may be said that many seedlings have been produced with satisfactory scab resistance, but among these it seems difficult to find some that have the other characters essential to an acceptable commercial variety.

In order to select the ones most likely to succeed, it seems to be desirable to make tests of the seedlings over a variety of conditions on different farms and in different years. Even then some critical weakness may not be discovered until the variety has been released and more widely distributed.

Of the seedlings previously released favorable results have been reported for the variety Ontario in a number of new areas and States in 1947.

In 1947, comparative tests were planted at the Robson Seed Farms, Hall; the L. T. Dunn & Son Farm at West Henrietta; the Irving Hopkins farm at Pittsford; and at the "Sky-High" farm of Smith-Coulter & Co., Canastota. Difficulty was experienced in making these plantings due to the continued wet weather encountered so that most of them were made later than was considered desirable especially as many of these seedlings are late varieties that need a long growing season for full development. The furrows were opened and the fertilizer was applied with a regular potato planter, but the potatoes were dropped and covered by hand. Seed lots were weighed out to give seed pieces averaging 1 1/2 ounces each. Four replications were planted in each case. Each plot consisted of 10 hills except at the Dunn farm where there were 25 hills each.

The plots were inspected several times for virus diseases and were rogued as soon as any was found. Some losses in stand also occured due to seed-piece decay. The stands thus varied to some extent in the different plots and this naturally affected the yields obtained. To correct for this variation in stand, the total yields for varieties were adjusted using the regression coefficient to correspond with the average stand for the plot. This is to some extent unfair to seedlings that are resistant to the spread of virus diseases or to infections by seed-piece decay organisms so that these characters may need some special consideration.

Test at Robson Seed Farm, Hall, N. Y.

This plot was located on soil thoroughly infested with the potato scab organism where tests have been conducted for some 10 years or more. The soil is well drained so that it was possible to plant on May 20 when most other fields were too wet for planting. Of the approximately 1 ton of fertilizer applied per acre, 500 lbs. (5-10-5) was plowed under and the remainder (7-7-7) applied in bands with the planter.

This plot was planted primarily to further test Dr. Reddick's blight- and scab-resistant seedlings, which had been in one test previously at the Hopkins farm. To these were added for comparison the varieties Katahdin and Rural and the previously named scab-resistant seedlings Ontario, Seneca and Cayuga. Also a few of the more promising U.S.D.A. seedlings were included insofar as seed was available.

In the rough classification as to lateness (N. Y. table 1), all of Dr. Reddick's seedlings (designated with three capital letters and a number as, EMF-1, DMK-8, etc.) are late or very late. They are thus more nearly comparable to Ontario than to Katahdin, Cayuga, or the earlier U.S.D.A. seedlings. With few exceptions they have satisfactory scab resistance for which they were selected but are likely to be weak in some other respect.

In N. Y. table 1*, are shown the total yields after adjustments for variation in stand. The deficiencies in stand in this case were mostly due to seed-piece decay and thus represent an undesirable character of the seedlings affected. Poor stands were obtained with FBI-1S, Rural, Ia 116-16, Col 6372, FBI-1R, ENP-11.

The next three columns of the table have been used to show the defects that render tubers unfit for first-class table stock; that is, the percentage grading No. 1 size, the percentage of culls due to scab, and the culls due to irregular growth, such as cracks and knobs. For the fourth column deductions have been made successively for these defects to show the net yield of salable potatoes. The table within seasonal groups has been arranged in the order of net yields based on this fourth column so that the seedling variety with the highest net yield in each group comes first. Thus B61-3 seems to be rather outstanding in the early group, although a little deficient in all three respects considered in arriving at the number of bushels of not salable tubers per acre.

Among the late potatoes in this test Ontario was outstanding; so much so in fact, that most of the seedlings appear to have little chance in comparison with it. Most of them produced 200 to 300 bushels less in net salable potatoes per acre. Much of the poor showing of the late seedlings was due to tubers of poor shape that were classified as culls due to growth cracks and knobs.

Test at the Irving Hopkins farm, Pittsford, 1947.

This was one of the tests where the planting was delayed till June 10, 1947, due to wet weather. The plot was very well sprayed and none of the varieties had matured 4 months later at which time the tops were burned off in order to harvest the crops before freezing. The bulk of the seedlings making up this test were from the U. S. Dept. of Agriculture and Stations cooperating with them. A few standard varieties and previously named scab-resistant seedlings were added for comparison. Seedling FBY-4 was one of Dr. Reddick's seedlings saved from earlier tests.

Poor stands were obtained with some of these seedlings, and although corrections in the yields have been made for these, a last column has been added to the table showing the stands as this seems to be a varietal characteristic to some extent. Seedling Ia 116-16 had a poor stand in this test as in several others in 1947.

In general, the yields were not high, being especially poor in the group of late varieties which usually have given the highest yields. This is tentatively attributed to the late planting and dry weather during the latter part of the season, which together kept the late varieties from reaching full development. The highest yield of salable potatoes was produced by seedling FBY-4, but this seems to be an exceptional occurrence as this seedling has been grown in some 8 tests without coming to the top previously, and in these tests averaging approximately 170 bushels per acre less than Ontario in both total yields and net yields of salable potatoes. It has been highly scab-resistant, is blight-resistant, and has given a consistent yield of nearly 300 bushels of salable potatoes per acre. There are several seedlings in each of the seasonal classes closely following in yield of No. 1 size potatoes, less culls due to scab and growth cracks and knobs. They were the earlies Col 6392 and Col 6332, the second earlies Col 6318 and B61-3, midseason Col 5271 and Col 6362, and late Mich 491-337-1. All of these are quite free from scab culls, although Katahdin had 52% and Rural 26.5% such culls. Under the conditions here the late seedlings had too many small potatoes and too few No. 1 size.

*See table on page 73.

N. Y. TABLE 1

Scab-Resistant Seedlings - Robsons - 1947
Planted May 20, Dug Sept. 18

	Adjusted yields per A.	Percentage No. 1 size	Percentage scab culls	Percentage cracks & knobs	Net salable per A.	Percentage scabby	Percentage Rhizoctonia
	Bu.	Pct.	Pct.	Pct.	Bu.	Pct.	Pct.
Earlies							
B 61-3	480.5	85.2	5.0	15.8	327.5	38.6	33.5
Col 6318	287.0	80.7	0	5.2	221.1	32.3	32.3
Col 7344	200.5	77.9	3.8	5.0	142.7	14.6	34.0
Mid season							
Cayuga	407.4	86.5	0	8.9	321.0	7.8	17.5
Col 5271	330.5	91.9	8.7	3.7	267.0	44.7	15.5
Seneca	324.1	90.7	0.5	10.5	261.8	31.1	25.5
Col 6317	284.4	86.0	0.5	11.0	216.6	43.4	17.5
Col 6372	301.1	88.4	29.2	3.7	181.5	63.3	39.0
Katahdin	346.6	92.2	47.7	4.5	159.6	75.2	29.5
Pur 279-32	192.8	68.4	0.7	8.7	119.6	15.5	22.5
Rural	294.0	93.3	62.3	8.4	94.7	71.0	11.0
Late							
Ontario	659.8	91.7	0	8.6	553.0	14.4	10.5
Ia 116-16	542.6	86.9	0.4	6.4	439.6	21.1	3.5
EMF-1	472.8	93.4	0.7	14.0	377.1	24.5	28.5
EMF-2	447.8	87.8	0	14.6	335.8	15.9	16.8
Mich.491-337-1	372.8	78.8	0.5	5.7	275.6	17.6	23.8
FBI-1R	317.7	90.1	8.7	11.3	231.8	64.7	2.5
DMK-8	339.5	80.7	0.3	24.2	206.3	21.6	34.3
ETR-10	386.3	64.5	17.0	2.1	202.5	58.4	18.3
Very late							
ENP-15	484.9	83.4	6.8	10.8	336.2	34.0	5.5
EPM-10	360.7	91.1	3.5	6.7	295.9	25.7	4.3
ENP-11	531.1	84.3	1.8	33.7	291.5	12.4	12.3
EZN-11	427.3	86.8	0.4	23.4	283.0	20.7	7.8
FJK-2	370.3	88.6	0.7	13.7	281.2	17.1	3.8
FBI-11	402.9	77.0	6.8	8.8	263.7	35.7	13.3
EMX-1	363.2	94.0	1.7	24.0	255.1	21.9	3.5
FBI-13	320.9	86.7	0	16.6	232.0	33.7	3.3
FBI-8	566.3	83.4	0	54.7	213.9	12.3	11.0
Least significant difference	164.1	6.4	9.3	7.8		15.8	15.0

Tests at the Dunn farm.

Two sets of seedlings were planted at the Dunn farm. In one were more promising selections from the U. S. Dept. of Agriculture seedlings with a few standard varieties planted in 25-foot plots; in the other were seedlings from Dr. Jehle in Maryland planted in 10-hill plots. These tests had dual purposes: to test the seedlings for scab resistance and to test for resistance to Z disease. The scab infestation here is of only moderate intensity as compared with some other test places. Katahdins had 37% scab and 12% scab culls, whereas Rurals had 28% scab and 19% scab culls. The seedlings selected for scab resistance all showed less than 1% of scab culls and not over 4% total scab. Only three of the varieties however, had relatively low losses from culls due to growth cracks and knobs. Thus in this test Katahdin, Mich 491-337-1, and Ontario were outstanding in yields of net salable potatoes in spite of the fact that the last two are late varieties which might have been handicapped by the late planting date (June 18).

Ontario with 12% showing slight discoloration was lowest in Z disease and Rural continued to be high with 58%. The other seedlings and varieties were intermediate.

Of the seedlings received from Maryland for tests on Z disease, only a few seemed to show high resistance, and those were relatively low in yield. Such a one is B98-7 which might be useful as breeding stock. Three of the seedlings had yields of net salable comparable with the better varieties in the other tests but two of these had high readings of Z disease. Many of these seedlings suffered rather high losses from irregular growth resulting in cracked and knobby tubers.

Sky-High farm test.

Originally it was planned to plant this test on peat soil heavily infested with scab, but the prolonged heavy rains made it impracticable to plant the field intended. The test was finally planted on May 30 in a field where the scab infestation was only slight. The result was that only 17% of the Katahdins and 21% of the Cobblers were scabby. Very few of these scabby tubers were severely affected so that they were not properly classified as culls. All scabby tubers were, however, deducted from the total yeilds in this case in calculating net salable potatoes on the assumption that on more heavily infested soil they would have been culls.

Ontario was outstanding here both in total yield and in net yields of salable potatoes, as it has been in several previous tests on peat soils. The seedling B 61-3 showed up very well here also in both total and net yields and apparently is worthy of further trial especially as it is a fairly early potato in contrast with Ontario which is late. Col 6318 was the only other seedling in the second early class to make a fair yield. Perhaps several of the others should also be tested further, especially from those in the midseason class.

An attempt has been made in N. Y. table 4 to roughly summarize the results of the tests of U. S. Dept. of Agriculture seedlings received in 1945 and planted in 3 to 7 tests in 3 seasons since that time. Since not all seedlings occurred in all tests, the average of the varieties Cayuga and Katahdin was used

N. Y. TABLE 2

Scab-Resistant Seedlings - Hopkins - 1947
Planted June 10, Dub Oct. 21

Varieties or seedlings	Adjusted yields per A.	Percentage #1 size	Percentage scab culls	Percentage cracks & knobs	Net salable	Percentage scabby	Percentage Rhizoctonia	Stand
	Bu.	Pct.	Pct.	Pct.	Bu.	Pct.	Pct.	
Early								
Col 6392	316.7	85.1	0	4.6	257.1	13.3	45.1	24
Col 6332	307.6	90.2	0.7	10.4	246.9	16.7	33.5	33
B 401-3	342.5	70.0	0	10.9	213.6	8.6	25.2	27
Col 6316	228.6	91.0	0	4.2	199.3	26.2	45.7	34
2nd Early								
Col 6318	288.3	92.4	0	5.0	253.1	13.0	53.1	38
B 61-3	343.0	82.8	0	16.4	237.4	63.0	54.3	36
Mid season								
FBY-4	334.1	87.1	0	1.9	285.5	0.7	67.7	36
Col 5271	272.3	91.6	0	2.1	244.2	16.8	69.5	38
Col 6362	284.1	91.3	0	6.6	242.3	6.3	67.2	36
Seneca	276.6	88.7	0	3.5	237.0	16.0	52.0	34.5
Col 6372	241.2	90.8	3.1	1.8	208.4	28.0	49.5	36
Col 6364	254.4	86.2	0	7.8	202.2	0.7	34.6	25
Col 6317	303.8	91.2	0	31.9	188.7	12.5	3.2	25
Ia 116-13	253.9	75.6	3.9	1.4	181.9	20.1	32.9	32
Cayuga	243.4	73.2	0	2.2	174.3	0.4	48.6	38
Pur 279-32	247.2	70.1	0.7	9.7	155.4	10.5	26.3	30
Katahdin	334.8	91.8	52.0	1.5	145.3	83.0	48.7	39
B 1086-2	256.0	49.9	0	5.0	121.4	11.9	11.6	19
Rural	191.7	80.8	26.5	3.3	110.1	45.9	68.0	37
Late								
Mich.491-337-I	320.4	75.7	0	0.9	240.4	5.6	6.6	37
Ontario	315.6	65.2	0	3.1	199.4	5.0	15.6	39
B 395-5	238.1	64.4	0	4.4	146.6	2.2	4.6	35
Ia 116-16	240.0	57.1	0	6.0	128.8	5.0	10.2	23
Least significant difference	100	10.3	7.7	7.3		18.7	19.6	

N. Y. TABLE 3 Scab and Z Disease Tests on Dunn Farm - 1947

	Total Yield per A.	Percentage #1 size	Percentage scab culls	Percentage cracks & knobs	Net salable	Percentage scabby	Percentage Z disease	Percentage Rhizoctonia
	Bu.	Pct.	Pct.	Pct.	Bu.	Pct.	Pct.	Pct.
Katahdin	355.6	92.5	12.0	7.0	269.2	36.8	48.5	20.8
Mich.491-337-1	333.9	82.7	0.5	5.0	261.0	4.0	17.3	0.0
Ontario	346.9	80.7	0	6.8	260.9	2	12	6.3
Pur 279-32	318.8	84.3	0	20.5	213.7	0.5	43	6.8
Cayuga	276.0	76.6	0	11.8	186.5	0.8	19	0
Seneca	258.5	82.5	0	16.0	179.1	0	20.3	6.5
Col 7344	238.3	80.3	0.2	14.8	162.7	1	32.5	26
Col 5271	228.8	93.2	0.3	23.9	161.8	2.9	42.5	29.3
Ia 116-16	248.8	86.2	0	27.2	156.1	1.6	19.3	2.5
Rural	250.3	82.8	18.8	12.0	148.1	28.0	57.8	45.0
Col 6317	271.6	88.2	0.8	47.7	124.3	2.4	46.8	0.8
B401-3	242.4	82.3	0.3	38.8	121.7	1.3	20.0	20.0
Least significant difference	44.1	6.8	6.3	9.8		9.0	16.6	18.9
				Maryland Seedlings From Jehle - Dunn Farm				
423-1	460.8	79.7	10.5	10.0	295.8	16.8	38.5	4.3
B 1018-29	438.3	82.2	2.3	17.5	283.8	6.8	14.3	0.5
B351-69	387.5	91.1	5.8	21.3	261.7	14.5	31.3	21.8
B 8-3	375.8	77.8	.3	16.0	244.9	3.0	32.8	4.0
B 77-1	331.0	74.5	1.0	10.0	218.5	5.3	33.5	8.3
B 87-1	392.7	83.0	11.3	24.8	217.4	17.3	21.3	12.0
B 434-127	281.9	82.5	4.8	12.0	194.8	25.3	10.8	0.3
B 164-15	333.4	85.1	4.0	41.8	158.5	10.5	58.0	4.8
B 112-1	302.0	67.0	8.8	15.3	156.3	18.0	29.5	10.8
B 98-7	219.5	46.7	.3	2.8	145.3	4.8	1.8	1.0
Rural	290.1	76.5	21.3	18.0	143.2	29.0	54.0	6.0
B 112-17	220.6	71.3	1.8	26.5	113.5	8.3	7.0	0

as a standard and the average gain or loss of each seedling or variety from this average was computed. This average gain or loss was added or subtracted from the average for these two varieties in all of the tests to serve as an estimate of the average total yield in N. Y. table 4. The percentage No. 1 size, scab culls, culls due to cracks and knobs, percentage scabby, and percentage Rhizoctonia are simple averages of the results in the several tests. The salable potatoes are calculated as in previous tables by subtracting from the total the tubers under No. 1 size, the scab culls, and culls due to cracks and knobs.

In the early, second early, and midseason groups, seedling B61-3 seems to be consistently outstanding in both total yield and in net yield of salable potatoes. It has some scab but is low as compared with the standard varieties. Its worst fault evident from the table seems to be in the percentage of tubers with cracks and knobs. It should be recalled also that in 1946 when planted in a field where the soil was infested with the Z disease organism it proved susceptible. It seems to have possibilities for use at least until something better is found. There are quite a number of other seedlings with net yields around 300 bushels in these tests in these three groups that may be worth further testing but in the tests so far conducted, none of them stand out as distinctly superior.

In the late group Ontario seems to lead but is closely followed by all the rest of the group and this group as a whole yielded better than any of the earlier groups.

Summary of Tests of D. Reddick's scab resistant seedlings.

A summary of the 2 years' results with the latest lot of Dr. Reddick's seedlings with some standard varieties is attempted in N. Y. table 5. This summary covers 2 plots of 4 replications each in 10-hill units. Nearly all of these seedlings are either blight-immune or highly resistant, as well as scab-resistant. They are all either late or very late. While Ontario seems to have outyielded them all, a number seem to have done better than Seneca and Cayuga. All of them seem to have satisfactory scab resistance but some had rather heavy losses from cracks and knobs. Among the more promising are EMF-1 and EMF-2 in the late group and ENP-15, ENP-11 and FBI-11 in the very late group. It is possible that some of these might prove practicable for small growers who do little spraying as they are both scab-resistant and nearly immune to blight.

Conclusions

Ontario still seems to be outstanding in yield among the scab-resistant varieties and seedlings.

Among the earlier seedlings, B61-3 seems to yield better than the others on the average. It is also said to be resistant to blight and net necrosis but is quite susceptible to Z disease (caused by Fusarium solani var. eumartii).

A number of other early seedlings are scab-resistant but have not given very encouraging yields.

In the late group, a number of seedlings are not too far behind Ontario to be considered such as B 395-5, Mich 491-337-1, and Ia 116-16, especially if it should be found that they have other characters which make them desirable.

N. Y. table 4. Summary Table 3 - 8 tests, 1945-47
Scab-resistant seedlings

	Tests	Ave. total yield	No. 1 size	Scab culls	Cracks & knobs	Salable per acre	Scab-by	Rhiz.
	No.	Bu.	Pct.	Pct.	Pct.	Bu.	Pct.	Pct.
Early								
Col 6392	4	369.8	89.4	2.5	8.5	294.9	31.5	43.5
Col 7344	7	359.7	81.8	2.1	6.1	270.5	17.3	41.9
B 401-3	6	362.1	85.2	0.1	17.7	253.7	15.9	32.4
Col 6316	3	277.5	90.8	1.0	5.0	237.0	30.5	52.9
2nd Early								
B 61-3	7	578.5	88.1	2.8	13.9	426.5	31.6	37.7
Col 6332	4	426.8	88.5	0.7	10.9	334.2	27.8	37.1
Col 6318	6	375.1	88.1	1.4	10.7	291.0	25.2	39.7
Mid season								
Seneca	6	416.6	90.2	0.1	8.5	343.5	14.9	26.6
Ia 116-13	4	422.0	85.7	1.5	3.9	342.3	22.8	28.0
Col 5271	7	408.1	94.4	5.0	8.7	334.1	30.0	47.5
Cayuga	8	449.2	84.3	0.0	12.5	331.3	6.6	21.8
Col 6372	7	410.7	91.7	6.8	5.8	330.6	33.7	38.9
Purdue 279-32	8	407.2	82.3	1.3	8.9	301.3	11.9	27.9
FBY-4	4	370.3	85.4	0.4	7.4	291.7	7.5	48.5
Col 6317	6	397.8	88.1	0.2	19.0	283.3	28.5	6.7
Col 6364	5	339.4	85.4	2.3	8.9	258.0	12.4	36.2
Katahdin	8	444.3	93.0	39.7	3.3	240.9	65.8	36.7
B 1086-2	3	330.5	75.9	2.9	6.9	226.8	23.4	26.4
Col 6362	4	346.5	85.3	17.7	10.0	218.9	35.6	56.7
Rural	5	344.0	78.2	22.0	7.3	194.5	29.7	39.3
Late								
Ontario	6	589.1	85.7	0.0	5.9	475.1	6.1	9.6
B 395-5	6	553.3	82.3	0.2	4.2	435.4	10.9	5.2
Mich 491-337-1	6	513.6	88.0	0.5	4.5	429.5	10.0	11.0
Ia 116-16	7	546.8	86.7	0.2	10.6	423.0	17.2	3.2
Approximate least significant differences		105	7.9	11.3	8.1		13.2	15.8

N. Y. Table 5. Summary table for 1946-47 of some of Dr. Reddick's blight-immune, scab-resistant seedlings.

Name	Total Av. Yield	Per-centage No. 1 size	Per-centage scab culls	Per-centage cracks & knobs	Net salable	Per-centage scabby
	Bu.	Pct.	Pct.	Pct.	Bu.	Pct.
Late Group						
Ontario	504.1	92.8	0	5.3	443.0	12.3
EMF-1	411.6	91.9	0.6	8.4	344.4	31.1
EMF-2	379.6	88.9	0	10.4	302.4	12.7
Cayuga	349.7	87.3	0	8.1	280.6	6.3
Seneca	302.8	92.5	0.3	8.2	256.4	33.8
DMK-8	359.4	84.7	0.2	19.0	246.1	18.8
ETR-10	365.1	74.3	9.0	2.3	241.2	46.1
Katahdin	386.0	94.5	50.0	2.3	178.2	75.2
Very Late						
ENP-15	415.8	84.0	4.0	6.9	312.2	32.9
ENP-11	452.3	86.1	0.9	19.5	310.7	10.6
FBI-11	404.1	83.6	3.4	6.0	306.8	33.1
EPM-10	327.8	91.7	2.7	4.3	279.9	29.3
EMX-15	340.8	95.8	1.7	18.5	261.6	31.3
EZN-11	358.1	83.1	0.2	14.8	251.3	13.1
FJK-2	310.2	87.5	0.4	7.8	249.0	11.1
FBI-8	485.0	77.1	0	37.9	232.2	6.5

E. V. Hardenburg and Herbert Findlen

The cooperative potato variety test project between the U. S. Department of Agriculture and the New York State College of Agriculture was conducted in eight counties in 1947. As usual, seed of several varieties was supplied by the U.S.D.A. from the potato sub-station at Presque Isle, Maine, and seed of other varieties was purchased or obtained gratis from individual seed growers in New York. The source of each variety tested is indicated in the summary tabulation. The aim always is to include only seed stocks which are reasonably free from virus. No lot obtained from the U.S.D.A. showed more than 10 percent virus, most of them not over 1 percent. Stocks of Pontiac, Erie, and four of the blight-resistant varieties showed more than 10 percent leaf-roll and may not therefore have reflected their true yielding capacity. These four blight-resistant varieties were Chenango, Cortland, Fillmore and Madison. The 1947 trials were located in Allegany, Broome, Erie, Monroe, Suffolk (Long Island), Tioga, Tompkins (Cornell Station), and Wayne (muck soil) counties. High water and flood damage ruined the Wayne County test sufficient to make the partial yield data useless. Because of excessive rains in northern New York, the trial planned for Clinton County could not be planted.

All seed was assembled at and distributed from the Cornell Station at Ithaca. All varieties were submitted in 15-pound samples sufficient for planting in 4 replicates of 25 plants each. A detailed planting plan providing for both replication and randomization was furnished to both grower cooperator and county agricultural agent. Cooperation was excellent and every test planted according to the plan furnished. This was the first year these tests were randomized within replicates rather than by systematic arrangement. Within each replicate, the varieties were grouped approximately according to season of maturity. Except on Long Island, growth of nearly all varieties was interrupted by a killing frost about September 23. This made it impossible to take data on comparative length of growing season required and time of normal maturity. This fact should be recognized when yields are compared.

Varieties Tested

A total of 30 varieties, including two seedlings, B70-5 and BY-I, both blight-resistants, were tested at Ithaca. In most of the other locations, about 25 varieties were included. Until this year, the only blight-resistant varieties developed by Dr. Donald Reddick which were tested were Placid and Virgil. In 1947, 6 other blight resistants were included. These were Ashworth, Chenango, Empire, Essex, Fillmore and Snowdrift. Blight-resistant seedling BY-I, tested only at Ithaca, was relatively low yielding and gave a low specific gravity reading

Yields Compared

The U. S. No. 1 size yields in bushels per acre for each of the 24 varieties tested in 7 counties in 1947 are summarized in N. Y. table 7.

Care is necessary to a fair interpretation of yield differences. All tests were planted within the dates normal for the locality except in Monroe County, which was planted on July 1, and accounts for the comparatively low average yield and perhaps means that such late-maturing varieties as Sequoia, Empire, Fillmore, and Ontario could not utilize their normally high yield potential. It must be remembered also that except for Suffolk County, growth of all except the very earliest varieties was stopped by a killing frost about September 23. Also, the true yield potential of Chenango, Fillmore, Pontiac, and Snowdrift is probably vitiated by the fact that stocks of all three were badly infected with leafroll.

Seedling B70-5, not listed in table 1, gave the highest average yield of any tested in 1947. This is in line with its performance in 1946. It appears to have everything to commend it, including yield, marketability, blight-resistance, internal quality, and fairly early maturity. Of the 12 named blight resistant varieties now on trial in New York, Essex and Ashworth gave significantly high yields. Since some certified seed of Essex was produced in 1947, this variety is likely to have a wide commercial trial in 1948. Essex and Ashworth both mature medium early. Essex has a very dark green, vigorous, upright, rugose foliage, while Ashworth is lighter green, spreading, smooth-leaved and less vigorous. No certified seed of Ashworth is available. Among the newer varieties that yielded well and which show most promise for increase in New York were Teton, Erie and Ontario. Teton and Erie showed some lack of heat and drought tolerance and Teton gave some trouble with spindle tuber, but both are highly marketable, high yielding and not too late in maturity. Ontario, because of its distinct scab resistance, high marketability, and high yield, seems sure to increase in popularity. In 1947, the total acreages passing field inspection were for Ontario 55, Erie 94, and Teton

17 acres. Mohawk, as usual, yielded about average for all varieties tested. Although about 40,000 bushels were certified, most of this in Maine, the problem is leaf-roll. Because of the superior baking quality and high starch content of Mohawk, it is being grown in several States by and for consumers who appreciate its cooking quality. Placid and Virgil are among best yielders and because of their blight resistance and mid-season maturity are maintaining their position. Very little seed of either was produced in New York in 1947. Genesee was again tested for the second year and yielded about the same as Katahdin, which it very much resembles in foliage, tuber and season of maturity. About 30 acres of seed were grown, but not certified. If it is superior to Katahdin, it will be a matter of possibly a few days earlier maturity.

Of the 30 varieties systematically tested for yield during the years 1945-1947, inclusive, a measure of yield differences has been made in terms of yield indices. These are shown in N. Y. table 7. Perhaps these ratings are the best answer to the question as to comparative yielding performance of the varieties concerned.

Specific Gravity Ratings

Up to now, yield, disease resistance, marketability, season of maturity, and reliability of crop are factors which seem to have been rated most important. Starch content or internal quality as measured by specific gravity nevertheless is important and eventually will play an important role in evaluating varieties. Specific gravity readings made by determining loss of weight in water were determined in 1947 for all varieties grown in the Tioga County and in the Cornell tests. Both were grown on fairly moist, fertile silt loam soils, the principal difference being slightly less maturity in the Cornell crop. A listing of specific gravity readings for the varieties in each test is shown in N. Y. table 8.

Some varieties consistently are of high specific gravity, others consistently low, while still others seem to vary depending on growth environment. Among those consistently high are Green Mountain, Mohawk, Rural, Russet Rural, Cobbler and Placid; among those consistently low are Pontiac, Chippewa, and Katahdin. Such well known varieties as Houma, Warba, Red Warba, Sequoia, and Sebago seem difficult to predict. It is still too early to be certain about such promising varieties as Teton, Erie, Ontario, B70-5, Essex, and most of the blight-resistant varieties, but these seem to be of average starch content and may prove to be good for boiling or for general purpose cookery.

NEW YORK

J. R. Livermore

Due to a most unusual season the lightest crop in many years was harvested. The field was not dry enough for planting until June 20 and the first frost occurred around September 20. All plants were dead by September 30, about 100 days after planting.

Leaf-roll continues to be the principal trouble in our endeavor to breed better varieties of potatoes. Even though nearly all the tubers to be used for planting had been indexed and a high percentage removed by this test, we still had to rogue

N. Y. Table 6. Potato Variety Tests in Cooperation with County Farm Bureaus - 1947
Department of Vegetable Crops, Cornell University
Yield of U. S. No. 1 Size - Bushels Per Acre

Variety	Source	Allegany County	Broome County	Erie County	Monroe County	Suffolk County	Tioga County	Tompkins County	Average*
Warba	U.S.D.A.	-	497	-	219	370	461	467	403 (5)
Cobbler	U.S.D.A.	411	423	210	206	352	392	485	354 (7)
Chippewa	U.S.D.A.	575	537	-	266	419	410	534	457 (6)
Chenango	Pratt	457	402	-	106	238	298	376	313 (6)
Genesee	Naas	489	507	-	208	-	413	483	420 (5)
Ashworth	Ashworth	562	627	-	339	-	503	622	531 (5)
Snowdrift	Pratt	457	383	-	130	-	364	421	351 (5)
Essex	Lake Placid Club	484	702	647	322	498	528	583	538 (7)
Houma	U.S.D.A.	392	557	440	304	391	329	438	407 (7)
Green Mountain	U.S.D.A.	468	520	-	201	416	492	485	430 (6)
Mohawk	U.S.D.A.	506	506	-	238	390	455	381	413 (6)
Placid	Pratt	498	623	582	249	302	523	471	464 (7)
Virgil	Pratt	490	489	613	232	465	485	408	455 (7)
Katahdin	U.S.D.A.	488	536	524	169	382	376	474	421 (7)
Teton	U.S.D.A.	458	453	-	246	469	522	392	423 (6)
Erie	I. Hopkins	444	562	-	266	377	421	423	415 (6)
Sir Walter Raleigh	Kent	443	556	-	198	-	369	352	384 (5)
Russet Rural	Peffer	394	453	-	194	-	264	305	322 (5)
Pontiac	Moore	416	524	-	215	469	391	399	402 (6)
Sebago	U.S.D.A.	536	630	546	115	386	531	390	448 (7)
Ontario	Robson	579	535	-	168	416	488	385	428 (6)
Fillmore	Lamb	301	389	433	207	288	376	290	326 (7)
Empire	Pratt	511	490	523	260	313	513	298	415 (7)
Sequoia	U.S.D.A.	531	628	370	263	402	490	401	441 (7)
Least significant difference at 5%		108	161	63	88	87	142	75	

*Number in parenthesis represents number of times tested.

N. Y. Table 7. Potato Variety Yield Indices in New York Based on 22 Replicated County Tests of No. 1 Size Yields in 3 Years - 1945-1947

Department of Vegetable Crops - N. Y. State College of Agriculture

Variety	No. Times Tested	Yield Index*	Variety	No. Times Tested	Yield Index*
B70-5	5	2.4	Houma	20	11.0
Essex	7	3.3	Warba	20	11.4
Ashworth	5	3.4	Rural	19	11.8
Sequoia	22	5.2	Katahdin	22	11.9
Virgil	13	7.5	Genesee	9	12.2
Green Mountain	21	7.6	Cobbler	21	12.3
Teton	21	7.8	Empire	7	12.3
Placid	13	7.8	Russet Rural	17	12.9
Erie	19	8.8	LaSalle	4	15.5
Menominee	6	8.8	DeSoto	4	16.0
Mohawk	21	9.6	Slocum's Early	6	17.0
Ontario	20	9.6	Red Warba	2	17.5
Pontiac	18	9.6	Fillmore	7	19.1
Chippewa	21	9.8	Snowdrift	5	19.8
Sebago	22	10.4	Chenango	6	21.7

*Summation of ranks in yield for each test divided by number of times tested. Varieties listed in descending order of yield, i.e., low index means high yield.

N. Y. Table 8. Specific Gravity Readings
Tioga County and Cornell University Potato Variety Tests - 1947
(High readings mean high starch content)

Variety	Specific Gravity		Variety	Specific Gravity	
	Tioga County	Cornell University		Tioga County	Cornell University
Green Mountain	1.077	1.088	Ontario	1.065	1.072
Empire	1.076	1.075	Sequoia	1.064	1.070
Mohawk	1.073	1.079	Chenango	1.063	1.077
Virgil	1.072	1.075	Snowdrift	1.063	1.077
B70-5	1.071	1.075	Ashworth	1.063	1.068
Placid	1.071	1.077	Erie	1.063	1.075
Sir Walter Raleigh	1.067	1.079	Warba	1.062	1.073
Russet Rural	1.067	1.079	Red Warba	1.062	1.076
Fillmore	1.067	1.071	Genesee	1.062	1.074
Cobbler	1.067	1.080	Chippewa	1.061	1.071
Sebago	1.066	1.073	Teton	1.060	1.075
Houma	1.065	1.075	Katahdin	1.058	1.070
Essex	1.065	1.068	Pontiac	1.054	1.064
Madison	-	1.078	Cortland	-	1.063
Harford	-	1.073	BY-I	-	1.062

out about 15 percent of the test rows in the field. The leaf-roll virus is not particular, so we lose many high-yielding strains, others with high vitamin C content, and some fine quality lines.

Because of their different characteristics we are using Houma, Sebago, Teton, U.S.D.A. Seedlings #336-144, and #47575 as standards in the test plots of our own seedlings. Seedling #47575 continues to look good. It is high-yielding, producing a white, smooth tuber of very good cooking quality. Again this year the leaflets remained flat when other plants around it were definitely rolled. Seedling #336-144 is a very fine sort except that it is so susceptible to leaf-roll.

Our major project is the production of a high-yielding, fine quality potato. The difficulty lies in attempting to get an early one. The problem is further complicated by trying to incorporate some disease and insect resistance. Several strains have escaped leaf-roll long enough to be tested for yield. Another year or two should find some one of those worthy of introduction.

The insect resistance study is progressing slowly. Apparently many more backcrosses with commercial type potatoes will be necessary before a strain producing tubers acceptable to the trade will be found.

The ascorbic acid phase of the major project is being continued. Due to the small crop this year there were not enough tubers over and above those necessary for planting in 1948 to provide adequate samples for assay. New crosses will be made in the greenhouse during the winter among as many high-vitamin C lines as prove to be cross-fertile.

In the leaf-roll resistance study we are endeavoring to find strains with some degree of field resistance. Apparently resistant lines will be back-crossed again by some of Dr. Folsom's highly resistant stocks.

NEW YORK

D. Reddick and L. C. Peterson

Blight

In most parts of New York the months of June, July, and most of August were exceptionally favorable for the spread of blight. Occasional fields were totally destroyed in July. The disease was abundant in poorly sprayed fields and prevalent in thoroughly sprayed ones. The harvest season was exceptionally dry, and rot was rarely found.

As in 1946, blight again appeared on several of the so-called blightproofs late in the season both on Long Island and in Central New York. The statements made in the 1946 report still stand substantially as they are there recorded. In a field near Ithaca the 12 named hybrids were entirely free from blight on Sept. 12, although standard varieties were totally dead with blight. However, on Sept. 18, blight in slight amount was found on all of the 12 new varieties. In the same plot B70-5 reacted in the same way; Teton and Ontario exhibited

considerable resistance; Sebago showed less resistance than these two; and Sequoia somewhat less resistance than Sebago.

Studies are now in progress to determine, if possible, what factors are responsible for the breakdown of resistance.

In all, 141 new crosses were made of which 94 have one or two scab-resistant parents. The only notable cross, and it has not been proved as yet, was that of S. polyadenium on an unnamed demissum hybrid which is self-fertile and which already is rated immune. Propach claims to have secured a cross with polyadenium by jamesii and to have lost the progeny with blight. If he really had a cross then the immunity factor in polyadenium is inherited differently from that in demissum (Or, his "blight" may not have been caused by P. infestans). Polyadenium has high resistance or repulsiveness for several different insects.

Scab

About 8,000 new seedlings were grown after blight-susceptible plants had been eliminated by inoculation. A generous selection (497 hills) was made of scab-free and scab-slight hills. An additional 200 hills were saved regardless of scab because they had passed the blight test. In both instances a good many "intermediates" are included which have value only as breeding stock.

Leaf-roll

About 100 plants were grown from a cross of blight-immune plant by a roll of resistant plant. These were not inoculated in seedling stage. All of the susceptibles became affected with blight in the field, but 88 hills produced tubers for leaf-roll tests.

Rugose Mosaic

About 100 plants from sib-mating or selfing of rugose-resistant plants were grown. The same thing happened as with the leaf-roll tests, but only 84 hills produced tubers for inoculation tests with virus Y.

Horticulture

Descriptions of 4 varieties have been published in October issue of American Potato Journal. Descriptions of Cortland, Essex, Fillmore, Glenmeer, Harford, Madison and Snowdrift are nearly completed. The stocks have been placed in the hands of seed growers for increase and will be sparingly available within 1 or 2 years.

Yield tests of some or all of the named "resisters" have been conducted by others both in New York and in several other States. Some phenomenal yields have been reported for Essex. It is most desirable that judgment on this variety be reserved until records can be obtained on its performance in a dry year.

Throughout the several years of plot testing Essex has never shown positive cases of either leaf-roll or mosaic. Tests are indicated to determine whether this is merely a fortuituous circumstance.

Yield test plots were continued in 5 widely separated localities. On Long Island, only the named hybrids were included. Elsewhere the tests were confined largely to unnamed hybrids. Certain of these hybrids made a very good showing and may emerge presently. Blight was not found on any of these plants at any time. No particular significance is attached to this because in one plot all plants were sprayed and in two others blight was checked in mid season by the incidence of dry weather.

NORTH CAROLINA

F. D. Cochran, J. H. Jensen, M. E. Gardner, T. L. York

The breeding program for eastern North Carolina is designed to develop and combine factors for resistance to Southern Bacterial wilt (B. solanacearum), earliness, yield, and desirable tuber type. Tests during 1947 were conducted at Cash Corner, for wilt resistance, and at Camden, for yield, earliness, and tuber type. These locations were used for this work in 1945 and 1946.

At Cash Corner the planting consisted of 558 lines in 10-hill units with Irish Cobblers planted in every third row. (N. C. table 1). Thus, all lines were adjacent to the susceptible variety. Random sampling of Irish Cobblers in the field showed that approximately 75% of the hills were infected, indicating fairly good conditions for testing under field conditions. Readings were made on incidence of wilt and late blight on the tops, and brown rot in the tubers. On 186 lines no symptoms of wilt in the tops or brown rot in the tubers appeared. These lines will be tested for resistance on a more thorough and extensive basis and will also be used for further breeding.

At Camden 36 varieties and lines were planted for tests on yield, quality, and general adaptability (N. C. table 2). The Irish Cobbler was the highest in yield and total solids in these tests. (N. C. table 4).

Western North Carolina - The work in the western, or mountain section of the State, is divided largely into three parts; namely, the growing and selecting of first-year seedlings, increasing selected seedlings, and testing for yield and disease resistance.

From 41 family lines 4,000 seedlings by the U.S.D.A., were grown in 1947. From this number, 191 selections were made. These will be increased in 10-hill units in 1948.

Of second-year lines 80 were grown in 5-hill units for increase and observation. Of other lines 619 were also grown in 5-hill units; duplicates of material tested for wilt resistance in eastern North Carolina were included in this material. Forty-six lines were grown in 20-hill units and 25 lines were tested in replicated yield trials. (N. C. table 3). Data for dry-matter content of the yield test at Jefferson are shown in N. C. table 4. A total of 4,770 clones were under observation and tests in western North Carolina.

N. C. table 1. Southern Bacterial Wilt Studies - Cash Corner, N. C.

Parents	Selections Planted	Selections Showing No Wilt or Brown Rot Symptoms
	No.	No.
Sequoia x 47156	1	1
No Blight x Katahdin	3	1
444-12 x Richters Jubel	2	1
Richters Jubel x 44537	5	1
Ostragis x Earlaine	3	1
Katahdin x Earlaine	2	1
3895-2 x Earlaine	4	1
Imperia x Earlaine	3	2
President x Katahdin	91	45
Green Mountain x 336-144	74	33
Houma x 336-144	44	14
Sebago x 46952	24	3
Earlaine x 46952	38	9
Earlaine 2 x 46952	10	1
96-28 x 336-144	5	1
96-44 x 336-144	37	4
46952 x Katahdin	6	2
46952 x 336-144	71	16
336-144 selfed	7	1
46952 selfed	8	1
Triumph selfed	2	1
Green Mountain x Triumph	4	2
Katahdin x Triumph	11	3
Houma x 1241.91	7	2
Houma x Shamrock	11	6
Houma x Katahdin	36	13
Sebago x 1241-91	4	3
Sebago x Shamrock	6	4
Shamrock x 227-48	1	1
1241-91 x 247-48	2	1
1276-179 x Shamrock	3	1
1276-179 x Triumph	3	1
47557 x 247-48	10	2
B107-a x 245-25	4	1
528-349 x 245-25	4	2
499-a x B56-11	5	2
499-a x 528-349	4	1
Chippewa selfed	3	1
Total	558	186

N. C. table 2. Yield Tests at Camden, N. C.

Variety or Number	*Mean Bushels Per Acre of U. S. No. 1
Irish Cobbler	430
142.9-9	329
Marygold	290
142.3-7	274
142.1-2	273
1362	268
29A-4	264
132.14-2	261
Sebago	260
142.9-19	257
Teton	253
142.10-9	249
142.16-7	245
27A-3	236
46952	218
46151	218
141.9-11	204
B77-18	197
Mohawk	196
1370	195
1355	190
XL123-8	189
B181-7	188
141.1-8	188
B188-9	182
1344	176
B100-3	176
B89-2	174
141.7-1	174
B77-18(2)	172
B181-4	160
NN176-9	140
47105	135
142.1-1	94
B206-4	91
29A-1	60

Differences between variety means for Significance at
5% level, 60 bushels
and at 1% level, 80 bushels

*Mean of 4 replications of 25 hills each, in randomized blocks.

Table 3. Yield Tests at Jefferson, N. C.

Variety or Number	1/Mean Bushels Per Acre of U. S. No. 1
Sequoia	549
Pontiac	422
NN176-9	385
Marygold	382
142.16-7	374
142.10-9	367
142.1-2	364
141.7-1	353
29A-4	339
142.3-7	324
Sebago	321
143.12-6	305
Mohawk	304
B188-9	293
B100-3	288
142.9-19	278
132.14-2	276
1344	255
Irish Cobbler	241
XL 41-3	222
1370	204
142.3-12	190
B89-2	175
B181-4	146
485	143

Differences between variety means for Significance at
5% level, 74 bushels
and at 1% level, 99 bushels

1/Mean of 4 replications of 25 hills each, in randomized blocks.

Table 4. Comparison of dry matter content in clones grown at Camden and Jefferson, 1947

clone	% of dry matter			Rank		
	Camden:	Jefferson:	Average	Camden:	Jefferson:	Average
I. Cobbler	19.83	19.66	19.74	1	1	1
132.14-2	19.47	18.40	18.93	2	8	2
B188-9	18.28	19.40	18.84	6	2	3
142.1-2	18.87	18.57	18.72	3	5	4
Mohawk	18.69	18.45	18.57	5	6	5
29A-4	18.81	18.23	18.52	4	9	6
142.9-19	17.93	18.86	18.39	8	3	7
142.16-7	18.23	18.43	18.33	7	7	8
Marygold	17.60	18.59	18.09	9	4	9
B89-2	17.57	17.79	17.68	10	10	10
142.10-9	17.20	16.97	17.08	11	13	11
B181-4	16.21	17.71	16.96	13	11	12
1344	16.84	16.83	16.83	12	15	13
142.3-7	15.67	16.89	16.28	14	14	14
Sebago	15.26	17.05	16.15	16	12	15
1370	15.51	16.71	16.11	15	16	16
141.7-1	14.89	16.08	15.48	17	17	17
B100-3	14.60	15.97	15.28	18	18	18
NN176-9	13.37	15.02	14.19	19	19	19
mean	16.63	17.24	16.94			

Analysis of Variance

	degrees of freedom	mean square	F value
Total	151		
Clones	18	1.12	16.82 **
Replications	3	.0067	.10 n.s.
Locations	1	.76	11.34 **
Loc X Clones	18	.092	1.37 n.s.
Loc X Repl	3	.04	.60 n.s.
Repl X Clones	54	.038	.57 n.s.
Repl X Clones X Loc	47	.067	

NORTH DAKOTA (Mandan)

W. P. Baird

Twenty-five varieties of potatoes were grown in one test at the Northern Great Plains Field Station, each variety being replicated 5 times in randomized blocks. The results of this test are shown in North Dakota table 1. All but the earliest varieties were still green when the vines were killed by frost on September 22.

In another test, 15 varieties obtained from the North Dakota Agricultural College were grown in two replications, except for two in single plots. Data for this test are given in North Dakota table 2. The highest yielder in this test (Pontiac x 15-1) is a large white potato with pink eyes.

North Dakota table 1. - Potato variety tests at the Northern Great Plains Field Station, Mandan, N. Dak. Planted May 22, and harvested Oct. 1, 1947.

Variety	Average Yield U. S. #1 per acre	Percentage #1 compared with total	Estimated percentage of green foliage when vines were killed by frost on Sept. 22, 1947.
	Bu.	Pct.	Pct.
White Rose	196.4	91	100
B-70-5	191.3	91	100
Pontiac	179.2	86	90
Earlaine 2	174.8	82	98
Irish Cobbler	171.5	78	80
Chippewa	159.3	85	100
Teton	159.3	87	100
Green Mountain	154.8	89	100
Mohawk	150.4	96	100
Houma	146.0	71	98
Erie	146.0	86	100
Katahdin	139.4	91	100
Sebago	132.7	87	100
Pawnee	120.6	67	50
Norkota	120.6	71	100
46952	118.3	78	25
Russet Rural	113.9	74	100
Earlaine	112.8	65	40
Rural New Yorker	112.8	87	100
Sequoia	109.5	85	100
Triumph	107.3	73	30
Mesaba	102.9	59	25
Kasota	92.9	59	60
Warba	87.4	52	25
Red Warba	81.9	47	25

Least significant difference at 5-percent level 29.
Least significant difference at 1-percent level 38.

NORTH DAKOTA

Wm. G. Hoyman and Harold Mattson

Among the selections grown in the scab nursery were 42 from the U.S.D.A., 9 from N. Dak., and 1 from Minn. Sixteen varieties were also included. Cobbler was used as a known susceptible variety planted at several locations throughout the plot. The planting was made June 2 and 3, 1947, and harvested the latter part of Sept. From the time of planting until the first killing frost, Sept. 21, 8.3 inches of rain fell compared with a normal of 12.5 inches.

North Dakota table 2. - Potato variety test of North Dakota Agricultural College potatoes at Northern Great Plains Field Station, Mandan, N. Dak. Planted May 23 and harvested Oct. 1, 1947.

Variety	Replications	Average Yield #1 per acre	Percentage compared with total	Maturity
	No.	Bu.	Pct.	
Pontiac x 15-1	2	168.6	93	Medium.
Pontiac	2	152.1	83	Medium-late.
Cobbler x 15-2	2	141.0	87	Medium-late.
472-5 x 11-1-3-2	2	124.4	63	Medium-late.
Satapa	2	121.6	69	Medium.
Irish Cobbler	2	110.6	64	Early-medium.
Katahdin o.p.	2	107.8	75	Medium-late.
Triumph	2	99.5	68	Early.
Pontiac x 15-2	2	99.5	69	Medium.
Pontiac x 171	1	99.5	70	Early.
47.02-3	2	94.0	74	Early.
Triumph x 29-32-1-34	2	85.7	79	Early.
80-7 x N.D. 1	2	85.7	68	Medium.
Red Warba x 15-2	1	83.0	72	Medium.
N. D. 1 x 92.36-5	2	80.2	65	Medium.

Least significant difference at 5% level 38.

Least significant difference at 1% level 53.

Three of the 42 U.S.D.A. selections showed no scab and 12 had type No. 1 pustule. B 61-3, one of the most resistant selections tested in 1946, continued to show resistance to the strains of Actinomyces scabies present in the Fargo scab nursery. B 70-5 had type 4 pustules, but this seedling was bred for resistance to late blight and not for scab resistance.

NORTH DAKOTA

Harold Mattson

Statewide Trial of Potato Selections

Seven North Dakota potato selections were grown with Cobbler, Pontiac, Satapa and Triumph, in trials with cooperators at Dickinson, Edgeley, Fargo, Hatton, Hettinger, Langdon, Mandan, Minot, Park River and Williston, N. Dak., and at the University of Manitoba, Winnipeg.

Yield of U.S. No. 1 potatoes from trials in eight locations is reported in N. Dak. table 3. Average tuber weight of all tubers and of U. S. No. 1 tubers is reported in N. Dak. table 4. Specific gravity of potatoes in trials in ten locations is reported in N. Dak. table 5.

White Selections Equal Cobbler in Yield

The five white-tuber selections are in a class with Cobbler in yield of U.S. No. 1 tubers. There was no significant difference between yields of the white selections and the Cobbler variety nor between the white-tuber selections themselves. All yielded significantly above Triumph.

Four of the five white selections were not significantly different from Cobbler in average weight of U.S. No. 1 tubers. Two of the white selections and Cobbler were significantly above Triumph in average tuber weight.

All white selections, and red selections and varieties, as well, were significantly below Cobbler in specific gravity in this trial. Three of the white selections were significantly above Triumph in specific gravity.

Red Selections and Varieties

Pontiac ranked significantly above Triumph in yield and tuber size and was significantly below all trial selections and varieties in specific gravity.

ND 178-3 is white in tuber color and has red eye color. While 178-3 was significantly above Triumph in yield and tuber weight, it was significantly lower in specific gravity. ND 178-3 has shown good yielding ability and attractive tuber shape in this and other trials. While its full oblong shape suggests a good baking potato this selection has almost always been poor in quality when baked.

Selection NND 96 is a round potato with red color somewhat more intense than that of Triumph. It did not differ significantly from Triumph in yield, tuber size and specific gravity in this trial or in a similar trial in 1946. There was some mosaic in the stock of this selection in the 1946 trial and more in the 1947 trial.

Satapa ranked with Pontiac in yield and with Triumph in tuber size and specific gravity in this trial. Satapa tubers were pale red in color.

Increase of Older Selections

Selections 148-84 and K5 were increased in isolated farm fields. Yields were respectively 125 and 225 bushels per acre and tuber size was small to medium. Selections 179-8 and 47102-3 were increased in the breeding plots. Selection 207-7 (Cobbler x 15-2) is similar to Cobbler in tuber shape and not of commercial promise. Red selections, 178-3 and NND 96, are being continued in small amounts.

Growing Potato Seedlings without Pots or Bands

Potato seedlings have been grown to maturity in wood veneer bands as a fall crop in the greenhouse from 1937 through 1946. The first 30,000 seedlings grown in 3-inch bands in this program produced an average yield of 4.2 grams per plant. Of this yield 70 percent was concentrated in the largest tuber as these averaged 2.9 grams.

Seedlings grown in soil without bands produced higher yields than seedlings grown with the same spacing in soil with bands in a trial in 1946. Fourteen hundred forty seedlings of 16 crosses were grown with and without bands in 3-inch and 3½-inch spacing. The trial yields are reported in N. Dak. table 6.

The production of twice the yield per hill and double the weight of the largest tuber from each hill in this trial led to the growing of practically all of the 1947 fall crop in 3½-inch spacing without bands. Yields were generally greater than those from material grown in bands in other seasons; the saving in cost and placing of bands was considerable; and no serious difficulties were encountered in harvesting the hills.

Increase of USDA Selections

The following USDA selections, saved largely on the basis of tuber shape, from a group grown at Grand Forks, were as follows in specific gravity:

USDA Selection	Specific Gravity	USDA Selection	Specific Gravity
B 61-3	1.081	598-29	1.089
70-5	70	598-46	70
75-4	90	604-3	90
137-5	73	604-5	87
311-41	85	604-18	78
469-5r	71	608-115	1.063
596-5	1,069	Chippewa	1.074
		Teton	1.078

N. Dak. table 3 Yield of U.S. No. 1 potatoes grown in 8 locations in 1947

Dickinson Edgeley Fargo		Hatton Hettinger Langdon	Minot Williston	
White	Bu/A	Pounds per plant	Bu/A	Red
		2.0	280	Pontiac
		1.9	267	178-3
		1.8	255	Satapa
47102-3	239	1.7		
Cobbler	239	1.7		
207-7	239	1.7		
179.8	229	1.7		
K5	228	1.6		
148-84	212	1.6		
		1.4	187	Triumph
		1.1	157	NND 96
Average	231	1.6	230	
Least significant difference	32	.23	32	

N. Dak. table 4 Average weight of U.S. No. 1 tubers vs. average weight of all tubers

Dickinson Edgeley	Fargo Hatton	Hettinger Langdon	Minot Williston	
	Average weight			
White	U.S. No.1 size	all tubers ounces	U.S. No. 1 size	Red
		5.7	6.7	Pontiac
		5.9	6.5	178-3
47102-3	6.0	5.5		
207-7	5.7	5.3		
Cobbler	5.4	4.3		
179-8	5.2	4.4		
K5	5.1	4.6		
		4.1	5.1	Satapa
		4.1	4.8	NND-96
		4.2	4.6	Triumph
148-84	4.4	3.4		
Least significant difference	0.9	0.8	0.9	

N. Dak. table 5 Specific gravity of potatoes in trials in 10 locations

Dickinson Edgeley	Fargo Hatton	Hettinger Langdon	Mandan Minot	Park River Williston
White potatoes		Specific gravity		Red potatoes
Cobbler		1.091		
207-7		85		
179-8		85		
148-84		84		
			82	Satapa
47102-3		81	81	Triumph
			80	NND-96
K5		79		
			78	178-3
			73	Pontiac
Least significant difference		.003		

N. Dak. table 6 Average yield of potato seedlings grown in 3-inch and $3\frac{1}{2}$-inch spacing within and without wood veneer bands.

	Spacing between plants	
Average weight per hill:	3--inch grams	$3\frac{1}{2}$-inch grams
Grown without bands:	7.7	9.2
Grown in bands:	3.7	3.8
Average weight per largest tuber of hills:		
Grown without bands	4.7	5.8
Grown in bands	2.6	2.6

OHIO

J. P. Sleesman and John Bushnell

Sixteen named varieties were compared with 52 numbered seedlings in a planting at Wooster. Due to a wet spring, planting was delayed until June 17. The plots were not sprayed during the entire growing season. Data were obtained on yield, leafhopper populations, amount of adult flea beetle feeding, class of late blight infection, and maturity (Ohio table 1). Late blight readings were made according to the U.S.D.A. system. This disease was very severe during the first week in September and all of the more susceptible varieties and seedlings were killed outright.

It is significant to note that 12 named varieties susceptible to late blight (Pawnee, Irish Cobbler, Katahdin, Pontiac, Sequoia, Mohawk, Sebago, Houma, Teton, Marygold, Cayuga, and Ontario) showed an average yield of 74 bushels per acre as compared with 320 bushels per acre for 12 late blight resistant numbered seedlings and named varieties (Empire, Placid, Virgil, B 294-65, B 313-21, B 313-32, B 354-18, B 351-69, B 61-3, B 69-16, B 478-1, and B 70-5). Seedling B 478-1 showed the highest degree of leafhopper resistance and very high yielding ability although the tubers tend to be large and rather coarse.

Fourteen numbered seedlings were compared with 6 named varieties in a planting on muck soil at McGuffey (Ohio table 2). The plots were not sprayed throughout the season. Late blight and leafhoppers were probably of equal importance in limiting yields. Seedlings B 70-5, B 61-3, Placid, and B 478-1 were the highest yielding sorts, the latter showing the most leafhopper resistance. From the standpoint of tuber appearance, Empire was the best of the Reddick group.

PENNSYLVANIA

J. Stanley Cobb

Twenty-two varieties and seedlings were tested for yield in 1947. The soil was a gravelly loam, grass-sod plowed. The rainfall was ample. Twelve hundred pounds of 5-10-10 fertilizer was applied at the sides of the row and at the depth of the seed piece at planting time. Some blight was present late in Sept., in spite of weekly spraying with 8-8-100 bordeaux and 5 applications of DDT. Very little leaf roll was observed. The test was planted in 4 replications. The yield data for these tests are given in Pa. table 1.*

* See Pennsylvania Table 1 on page 103.

Ohio table 1.--Yield, percentage of U. S. No. 1 tubers, adult flea beetle injury, leafhopper populations, class of late blight infection for 68 named or numbered seedlings. Wooster, Ohio. 1947

	Yield 1/		Flea beetle holes per leaflet	Leaf-hopper nymphs per leaf	Late blight class 2/	Maturity 3/
	U.S. No. 1 tubers per acre	Percentage U.S. No. 1 tubers				
	Bu.	Pct.	No.	No.		
Pawnee	96	46	9		8	E
Irish Cobbler	179	57	10	4.6	6	E
Katahdin	93	74	10	5.6	6	M
Pontiac	109	59	7	10.0	6	L
Sequoia	33	45	5	3.1	5	L
Mohawk	30	38	4	2.9	6	L
Sebago	48	72	12	5.8	5	L
Houma	52	43	8	3.2	8	L
Teton	25	36	4	4.5	6	L
Marygold	125	65	7	4.5	6	L
Cayuga	28	20	6	2.9	4	M
Ontario	71	43	9	2.8	4	L
Lake	68	62	20	4.2	5	L
Empire	218	71	5	2.1	1	L
Placid	389	71	4	2.2	1	L
Virgil	291	82	3	3.3	1	L
B 109-7	33	69	11	1.9	4	L
B 137-8	11	27	8	2.3	6	L
B 287-8	166	68	16		8	E
B 287-10	107	72	10	4.3	7	E
B 294-29	11	41	7		7	L
B 294-65	242	69	12	3.9	1	M
B 306-2	65	47	4	5.1	6	L
B 313-16	71	52	20	2.9	7	E
B 313-21	297	78	16	3.0	1	E
B 313-32	351	83	6	3.5	1	L
B 313-43	150	82	9	4.1	1	M
B 313-73	11	37	10	4.0	7	L
B 313-88	39	67	5	4.9	6	L
B 354-6	259	84	13	2.7	1	L
B 354-17	158	71	10	3.4	1	L
B 354-18	310	87	16	3.5	1	E
B 354-22	145	70	16	3.7	1	E
B 354-23	152	61	11	3.1	1	E
B 355-67	237	65	9	3.6	1	E
B 311-15	92	61	16	4.4	7	E

Ohio table 1.--Continued

	Yield 1/ U.S. No. 1 tubers per acre	Percentage U.S. No. 1 tubers	Flea beetle holes per leaflet	Leaf-hopper nymphs per leaf	Late blight class: 2/	Maturity 3/
	Bu.	Pct.	No.	No.		
B 311-41	49	43	11	4.2	6	M
B 311-44	47	63	13	4.3	6	L
B 311-52	128	70	4	4.4	5	M
B 311-54	135	70	19	3.5	8	E
B 311-64	63	58	9	2.8	6	E
B 320-76	47	43	8	4.0	7	L
B 327-6	38	56	18		8	E
B 351-44	5	24	5	3.7	4	L
B 351-69	259	85	16	5.4	1	L
B 61-3	357	65	6	3.7	1	M
B 69-16	343	81	8	3.0	1	L
B 70-5	390	87	8	6.0	1	M
B 478-1	395	91	10	1.2	1	L
B 446-26	128	73	4	3.3	1	L
B 477-15	108	70	14	2.8	1	L
B 477-29	264	74	6	3.4	1	L
B 477-44	191	72	6	3.4	1	L
B 269-20-37	33	55	7	4.4	4	L
B 269-20-56	118	55	8	2.7	7	M
B 280-2-41	28	37	9	3.5	6	L
B 313-10-55	168	78	10	3.6	1	L
B 493-3	57	52	24	4.5	4	L
B 499-15	11	50	17	3.9	6	M
B 475-90	82	50	5	2.8	1	L
B 504-3	44	47	5	4.9	6	L
B 532-6	19	33	17	3.4	5	L
B 542-1	85	77	4	3.2	1	M
B 591-55	234	81	7	2.1	1	L
X 590-6	14	39	5	3.3	5	L

Ohio table 1.--Continued

	Yield 1/ : U.S. No. 1 tubers per acre	Percentage U.S. No. 1 tubers	Flea beetle holes per leaflet	Leaf-hopper nymphs per leaf	Late blight class 2/	Maturity 3/
	Bu.	Pct.	No.	No.		
X 590-7	17	26	10	4.1	7	L
336-144	25	32	4	3.7	5	L
C.S. 6317	36	38	9	3.2	6	L

1/ Mean of single row 50-hill plots, 2 replications in randomized blocks.

2/ Classes of infection.
1 = No blight
2 = Occasional leaf with pustules
3 = 8-12 compound leaves per hill with blight spots
4 = Approximately half of leaflets with blight spots
5 = Approximately two-thirds of leaves dead
6 = All but apical leaves killed, stalks green
7 = Stalks green, all leaves killed
8 = All leaves and stalk dead

3/ E = Early
M = Medium
L = Late

Ohio table 2.--Yield, percentage U.S. No. 1 tubers, leafhopper populations, and yield for 20 named and numbered seedlings grown on muck soil. McGuffey, Ohio. 1947.

Variety or Seedling	Yield 1/ U.S. No. 1 tubers per acre	Percentage U.S. No. 1 tubers	Leafhopper nymphs per leaf	Foliage score % alive August 12
	Bu.	Pct.	No.	Pct.
Irish Cobbler	306	78	8.6	10
Katahdin	318	85	5.2	65
Lake	366	90	6.4	25
Empire	396	90	1.0	100
Virgil	378	90	1.0	100
Placid	474	88	1.1	100
B 61-3	462	86	5.4	60
B 70-5	534	94	5.0	70
B 109-7	318	80	1.8	75
B 269-30-37	408	86	8.9	70
B 269-20-56	276	85	3.7	20
B 280-2-41	264	90	5.2	25
B 313-10-55	414	95	1.7	100
B 313-21	462	93	3.0	75
B 354-18	216	90	3.0	50
B 446-26	210	90	6.8	80
B 478-1	480	97	1.2	100
X 590-7	252	90	4.6	40
C.S. 6317	270	90	7.6	50
336-144	318	85	3.6	60

1/ Mean of single row 50-hill plots, replicated 4 times in randomized blocks.

PENNSYLVANIA

W. R. Mills

The breeding program at Pennsylvania State College has continued much as in the past, with major emphasis placed on blight and scab resistance. A 2-acre plot at State College contained 25 varieties replicated 5 times, 95 varieties in 2 replications, 310 new seedling selections in 7 to 10 hills, 6,000 single-hill seedlings, and 70 named and unnamed varieties maintained for breeding stock and special uses.

BLIGHT TESTS

In 1946, late in the season, blight developed on a variety that had been immune in the field and greenhouse during 3 previous years. During the winter of 1946-47, all "immune" varieties (about 550) were inoculated with the new isolate. About half of all the varieties that had derived their immunity from parent TI-5 were susceptible. TI-5 is immune. No other parent in our possession was segregating susceptibles to this race. Blight was not detected in the field on the several varieties susceptible to the new race because they were earlier maturing and died before the new race appeared.

Blight was moderately severe at State College in 1947, eventually killing such susceptible varieties as Green Mountain, Katahdin, and Russet Rural. The varieties susceptible to the new race did not blight.

In the 1946 report of the National Potato Breeding Program Reddick and Peterson reported that on some varieties, Phytophthora infestans established itself on senescent leaves, where the virulence was gradually increased. This phenomenon has not been observed at State College, where almost daily searches were made, nor in regional trials, which were Bordeaux-sprayed. We are now in the process of testing with the new fungus obtained from Cornell. The majority of the varieties so far tested are very susceptible. The only immune parent yet found is the same TI-5 that is segregating susceptibles to the race discovered last year at State College. The problem of blight immunity becomes more and more involved.

REGIONAL TESTS

In cooperation with Dr. O. D. Burke, Extension Pathologist, regional tests were conducted in Lehigh, Schuylkill, Potter, Lancaster, and Clarion counties. Sixteen varieties were planted at each location, each variety replicated 4 times with 40 hills per replication. Yields are shown in Pennsylvania table 2. Varieties designated by letter are Pennsylvania selections. Essex produced the highest yield of the group, with an average yield for the 5 locations of 543 bushels per acre. The crop was smooth and of a desirable size. Virgil, number two in yield, was too rough and deep-eyed when grown in the relatively heavy soil which prevailed for most of these tests. The low yield of Ashworth can be attributed to the poor seed, which averaged 26% leaf roll and 20% rugose mosaic.

Pa. table 1. Yield data for potato varieties tested at State College, Pa., 1947

Variety	Yield per acre	Variety	Yield per acre
	Bu.		Bu.
Triumph	342	Mohawk	322
Irish Cobbler	309	Sebago	283
Pawnee	330	Pontiac	395
Early Ohio	202	Virgil	378
Spaulding Rose	338	Fillmore	293
Colo. 6317	314	Empire	253
Chippewa	456	Rural	263
Katahdin	284	Russet Rural	318
Marygold	434	B 70-5	472
Erie	332	B 69-16	348
L.S.D.	96	Sequoia	317
Green Mountain	271	L.S.D.	48

It will be noted that B 70-5 produced the highest yield in the test with Chippewa and Marygold not significantly different. The yields of these three varieties greatly exceed those of either one of the Rurals. B 70-5 is highly resistant to late blight in Maine.

Much interest is shown among growers in the variety Teton, which produced 459 bushels per acre in our tests. We note that according to the Federal-State Crop Reporting Service, of 69,435 bushels of Teton certified in the United States in 1947, 55,236 bushels were certified in Pennsylvania. No rejections were made in the variety because of ring-rot. Neither Dr. Burke nor I have seen ring-rot in any commercial planting of Teton. Teton has already been instrumental in reducing the amount of ring rot in Pennsylvania.

Pa. table 2. Average Yields of 16 Varieties at 5 Locations

Variety	Bushels per Acre
Essex	543
Virgil	516
Pontiac	511
Teton	459
Erie	457
2UD-1	438
Placid	435
CV-1	410
AB-5	408
Empire	401
Ontario	393
Russet Rural	389
Katahdin	385
Sebago	353
Ashworth	324
BY-3	316

RHODE ISLAND

T. E. Odland

The yield data are shown in R. I. table 1. This is the average yield of 4 replicates. Each replicate consisted of a 32-foot row. The season was favorable and yields were larger than usual.

Chippewa produced the largest average yield. It is a standard variety in Rhode Island, and can be depended on to give good results -- only 5% leaf roll. Late blight came after crop was made.

Ontario was again among best. It is late, but a decidedly promising variety for Rhode Island. However, did much better this year than last -- only 10% late blight.

B 70-5 continues to look good. It had a high percentage of leaf roll, but still produced a 500-bushel yield--some growth cracks in tubers.

Sequoia yielded well in spite of considerable leaf roll. 5% of tubers showed growth cracks. This is a very vigorous-growing variety.

R. I. table 1. Yield data on varieties and seedlings tested at the Rhode Island Experiment Station in 1947.

Variety or Seedling	Yield per A 1/ U.S. No. 1	Percentage U.S. No. 1
	Bu.	Pct.
Chippewa	549	96
Ontario	537	96
Houma	518	93
Menominee	496	97
B 70-5	496	96
Sequoia	494	97
Green Mountain	486	98
Potomac	482	95
Sebago	472	96
Erie	449	93
B 69-16	441	97
Teton	440	98
B 61-3	416	97
1276-185	395	92
Russet	392	96
Katahdin	388	98
Mohawk	352	98
Pawnee	311	92
Irish Cobbler	311	94
Cayuga	303	82

Least significant difference - 89

1/ Mean of 4 replications of 32-hill rows

SOUTH CAROLINA

William M. Epps

Forty-three potato varieties and seedlings were tested in replicated yield trials in South Carolina in 1947. These included the 6 varieties currently grown in this State, 24 seedlings, and 3 new varieties from the U.S.D.A., and 2 seedlings and 8 new varieties from the N. Y. Expt. Sta.

The season of 1947 was very favorable for the growth of potatoes. For 2 months after planting the weather was so cold that emergence of the plants was delayed. Then a killing frost during the last week of March killed the few plants which had emerged. After this last frost emergence was rapid and subsequent growth was rapid and regular. Only the very early varieties had matured at the time of harvest. The later varieties and seedlings, such as Sebago, Empire, and B70-5, were still green and had not made their full growth. For this reason the earlier varieties showed up much better than the later ones.

Late blight was not a factor in determining the yields. It appeared in the yield plot area both at the experiment station and on Wadmalaw Island just before harvest. At the time of harvest only a trace could be found. Other diseases, such as leaf roll, mosaic, and black leg, were present in some lots of seed, but were not generally present in more than trace amounts.

Several of the new seedlings looked particularly promising (S. C. table 1). B76-43 ranked No. 1 in yield (significantly above its closest competitor) in both trials in which it was included, but was not as attractive in appearance as Katahdin or Sebago. B73-16 produced a high yield of very attractive tubers. B137-5 looked particularly promising for use as a long white potato for those growers who prefer that type of tuber. B70-5 and B354-18 also looked very good. Essex was the best of the blight-resistant varieties from New York. The 2 scab resistant varieties, Ontario and Cayuga, were found to be poorly adapted and are not deemed worthy of further trial.

All of the 43 varieties and seedlings, except B77-32 and B354-18, were planted in a scab nursery. Four replicates of 10 hills each of each variety were planted. The tubers were examined and the extent of scab measured by counting the number of tubers showing deep or pit scab lesions. Scab infection was light or moderate even on the very susceptible varieties. Infection was generally worse on late than on early varieties.

S. C. table 1. Yields of potatoes included in replicated trials at Charleston, S. C., 1947.

Variety or Seedling	Yield per acre		Scab Index 2/	Remarks
	Station 1/	Wadmalaw Island		
	Bu.	Bu.		
B76-43	515	460	2	Slightly russet skin, round
B73-16	463	375	4	Smooth, oval, attractive
B61-3	460	365	1	Slightly rough, oval
B354-18	460	-	-	Late, very attractive

(Continued on next page)

S. C. table 1. (Continued)

Variety or Seedling	Yield per acre		Scab Index 2/	Remarks
	Station 1/	Wadmalaw Island		
	Bu.	Bu.		
Essex	458	-	4	Midseason, round - oval
B70-5	453	375	4	Late, long, very attractive
B69-16	448	362	4	Round, slightly rough
Pontiac	444	358	5	Red
White Rose	440	358	2	Long, late, very rough
B87-1	438	383	5	Round, attractive
B137-5	435	348	3	Long, very attractive
X403-5	435	320	1	Slightly rough, round
Ashworth	398	-	3	Attractive
B69-11	397	382	4	Round
Teton	395	360	4	Oval, very attractive
Bliss Triumph	393	348	4	Red
Irish Cobbler	389	387	4	Slightly rough, round
Placid	385	-	4	Oval, appearance fair
B73-10	375	358	1	Oval, very smooth, slightly russet skin.
B73-3	372	318	4	Oval, attractive
Pawnee	363	335	5	Oval, attractive
B91-14	358	298	1	Oval
B76-23	355	273	2	Round, slightly rough
B77-32	353	-	-	
Katahdin	351	298	4	Round, very attractive
Ontario	343	-	2	Rough, appearance poor
Mohawk	338	288	5	Long, very attractive
B70-4	327	253	4	Oval, very attractive
X590-7	320	295	4	Oval, very attractive
Sebago	318	222	2	Long, late, very attractive
X927-3	312	-	5	Long, slightly rough
B89-2	308	272	2	Round, very attractive
B142-7	302	308	5	Oval
X150-10	295	297	4	Round
X494-1	292	355	2	Round, slightly rough
Chenango	288	-	5	Oval attractive
46952	275	318	2	Small, oval - round
Virgil	273	-	2	
CZK-7	255	-	1	Red, rough, very late, Rural type
Cayuga	215	-	0.5	Leaf roll severe, rough
DFC-1	215	-	2	Late, rough
Empire	198	-	5	Very late, rough, Rural type
B69-12	122	-	1	Weak vines, very late
Minimum difference required for significance at 5% point				
at 5% point	52-72	62		
at 1% point	68-98	82		

1/ Includes results from 3 separate trials located in a single uniform field. Plot size and replicates varied depending on quantity of seed available.

2/ Based on percentage of tubers discarded because of deep or pit scab lesions (from scab nursery) 0.5 - up to 5%; 1 = 5 to 12½%; 2 = 12½ to 25%; 3 = 25 to 40%; 4 = 40 to 70%; 5 = 70 to 100%.

TEXAS

W. H. Friend

Conditions were not favorable for potatoes during the fall season of 1946, and yields were quite low. Temperatures were abnormally high in September, October, and December, and this seemed to have a depressing effect on yields. Stands were reduced because of the unfavorable September weather.

The data were collected and assembled by Norman Maxwell, Assistant Horticulturist.

The Yield data for 6 named varieties are given in Texas table 1. It will be noted that the Triumph yielded only 136 bushels per acre when the No. 1's and No. 2's were added together. The yield of Pontiac was slightly higher but not significantly.

The yield data for 19 U.S.D.A. numbered seedlings are given in Texas table 2. The highest yielder in this group was B 76-43 with 183 bushels per acre; the second highest was B 70-5 with a yield of 165 bushels per acre of U.S. No. 1's + U.S. No. 2's. B 76-43 outyielded Triumph significantly but B 70-5 was in the same class as Triumph if the least significant differences are taken into account.

Texas table 1. Yield data of 6 named varieties at Weslaco, Texas, in 1947.

Variety	Yield per acre	
	U.S. No. 1 + No. 2	U.S. No. 1 + No. 2
	Bu.	Percent
Katahdin	92	89
Sebago	90	91
Mohawk	102	89
Pontiac	142	94
Teton	116	93
Triumph	136	93
L.S.D.	12.7	

Texas table 2. Yield test of U.S.D.A. Seedlings at Substation No. 15, Weslaco, Tex., in 1947

Seedling Number	Yield per acre	
	U.S. No. 1 + No. 2	U.S. No. 1 + No. 2
	Bu.	Percent
B 61-3	91	94
B 69-16	130	92
B 70-5	165	94
B 75-4	52	88
B 76-43	183	98
B 273-31	119	89
B 294-29	95	96
B 311-15	119	91
B 311-44	103	89

Continued on next page

Texas table 2. (Continued)

Seedling Number	Yield per acre	
	U.S. No. 1 + No. 2	U.S. No. 1 + No. 2
	Bu.	Percent
B 311-54	60	89
B 313-32	125	91
B 313-43	59	92
B 313-70	89	95
B 313-88	110	92
B 354-6	87	90
B 354-17	73	88
B 354-18	73	93
B 354-22	68	90
B 354-23	81	91

Difference required at 5% level 40.3

VIRGINIA (Blacksburg)

Flood S. Andrews

In 1947, 9 potato varieties were tested for yield at Blacksburg. The data for this yield test are given in Virginia table 1. It will be noted that Sequoia outyielded all the other varieties significantly. Potomac also showed up well. The Irish Cobbler was the poorest, with less than half the yield of the Sequoia.

Virginia table 1. Yield of potato varieties in bushels per acre grown at Blacksburg, Va., in 1947.

Variety	Yield per acre
	Bu.
Sequoia	536
Potomac	451
Ajax	432
Green Mountain	427
Pontiac	415
Sebago	411
Katahdin	288
Chippewa	270
Irish Cobbler	249

Difference required at 5% level - 27.3

VIRGINIA

M. M. Parker

The potato-breeding investigational work in eastern Virginia consists of growing and selecting seedlings for type, yield, and resistance to diseases.

Virginia is placed in the intermediate potato-producing States, and has a rather limited period in which it can profitably dispose of its crop. Harvesting usually begins in late June and continues throughout July. In order to get the potatoes to market as early as possible early maturing varieties, such as the Cobbler, are grown exclusively. However, a second crop can be produced in late summer to be harvested in early November. Many of the later maturing varieties can be grown at this time, giving in most cases better yields than those from the Cobbler planted at the same time. The purpose of the breeding program is to obtain a variety more suitable for culture in this section than the Cobbler or the varieties now used for a late crop.

The length of the growing season here permits us to grow two generations in one season, starting with the true flower seed which is planted in January under shelter. The young seedlings are transplanted into flats and moved to the open where they mature during May. Tubers from these plants are given a rest period of about 2 months and are then replanted in July. Full commercial size seed can be harvested from this planting in late October or early November. In 1946 more than 150 100-pound sacks per acre of all size potatoes were obtained from some of the second-generation seedlings. Although we are able to rapidly increase the seedlings it is very difficult to maintain good selections because of the prevalence of leaf roll which causes deterioration of even the best strains.

Virginia table 2 gives the pedigree of some of the crosses obtained from the U.S.D.A. and the acre yield (non-replicated plots) from second clonal generation plants harvested in late October and early November.

Virginia table 2. Pedigrees and yields of crosses grown from seed obtained from the USDA

Pedigree	Yield per acre, all grades
	100-lb. sacks
Menominee X 63-1	104
Green Mt. X 96-28	111
41956 X Menominee	139
188-9 X Katahdin	167
96-56 X Katahdin	154
Mohawk X 96-56	124

Continued on next page

Virginia table 2. (Continued

Pedigree	Yield per acre, all grades
	100-lb. sacks
Sebago X (245-25)	98
White Rose X 287-2	115
Green Mt. X 76-7	62
83-9 X Katahdin	95
Green Mt. X Katahdin	108
Menominee X Earlaine	84
Earlaine X Teton	48
Potomac X Katahdin	80
Earlaine X 95-345	74
White Rose X Teton	80
Houma X 402-1	43
83-9 X 627-126	94

At the time of harvesting the second generation, hill selections were made within the crosses for type, yield, and appearance. These selections were replanted in the spring of 1947. Virginia table 3 gives the pedigrees and the number of strains within a cross that were considered sufficiently desirable to carry over for further trials.

Virginia table 3. Pedigrees and number of selections made from crosses.

Pedigree	Third clonal generation selections
	No.
83-9 X Katahdin	6
188-9 X Katahdin	2
Menominee X 61-3	1
Mohawk X 96-56	3
Green Mt. X 96-28	2
Green Mt. X Katahdin	2
41956 X Menominee	1
White Rose X Teton	1
Menominee X Earlaine	1

The 83-9 X Katahdin cross produced the greatest number of segregations for what we thought were desirable tuber shapes and sizes. The segregations varied from elongate to round tubers with many large specimens. Most of the tubers were

very smooth with shallow eyes and the somewhat brownish skin of the Katahdin. They varied in maturity from second early to late. 188-9 X Katahdin also produced very smooth tubers of exceptional size. The strains were mostly round to oval flat in shape. They also were brownish colored. Green Mt. 96-28 yielded uniformly shaped potatoes that were very attractive but since the tubers did not get very large it seems that somewhat low yields could be expected from the cross. This lot could probably be used to advantage as a late crop where better growing conditions usually occur and where larger yields are expected. The Mohawk and Menominee crossed with other varieties generally gave very large tubers which were somewhat rough and in most cases had somewhat deep eyes. These lots did show promise of good yields, but could probably be used in this section only for the late crop. White Rose X Teton in general gave very poorly shaped potatoes with deep-set eyes and an irregularity of outline. This cross did not seem to offer much hope for improvement over existing varieties.

Although most of the crosses were made primarily for disease resistance, it was not until the late crop of 1947 that an opportunity for testing blight resistance arose. Some of the second-generation mass lot crosses held over for late planting encountered epidemic outbreaks of blight. The planting was made alongside a planting of Sebago, which were completely defoliated by the disease several weeks before the end of the growing season. Virginia table 4 gives the percentage of plants in some of the pedigrees that were apparently free from blight at the time the Sebago planting was destroyed.

Virginia table 4. Late blight data on progenies grown at Norfolk in 1947.

Cross	Plants defoliated	Plants partially defoliated	Blight-free	Clean
	No.	No.	No.	Pct.
Menominee X Earlaine	78	25	3	3
Green Mountain X 98-28	51	12	69	52
Sebago X 245-25	29	24	3	5
Menominee X 61-3	21	9	16	34
Potomac X Katahdin	48	-	-	-
41956 X Katahdin	24	6	1	3
Mohawk X 96-56	33	8	16	28
Earlaine X 96-345	52	6	0	0
188-9 X Katahdin	17	4	25	54
White Rose X Teton	53	3	0	0
Green Mt. X Katahdin	35	13	0	0
96-56 X Katahdin	30	6	19	34
Unit 2216	3	3	10	62

The third generation mass lots were also placed in a scab test experiment, but insufficient inoculation occurred even with susceptible varieties to get any worthwhile information from the test.

A rather large number of individual hill selections sent to us for the early 1947 planting for observation purposes included some lots that showed considerable promise from a yield, type, and time of maturity viewpoint. Va. table 5 gives the pedigree number and the yield of the lots that seemed most promising for this section.

Washington table 1. Yields and percentages of No. 1 tubers of potato varieties grown at Puyallup, Wash., in 1947.

Variety	Yield per acre of U.S. No. tubers	
	Bushels	Percent
Earlaine No. 2	985	92
Sequoia	958	97
White Rose	927	93
Sebago	791	95
Mohawk	787	97
Netted Gem	748	92
Green Mountain	682	87
Teton	634	93
Chippewa	634	91
Houma	622	89
Pontiac	622	93
Bliss Triumph	617	86
Katahdin	612	91
Red Warba	598	93
Kasota	595	89
Pawnee	552	93
Irish Cobbler	520	87
Mesaba	489	86

1. Planting distance - Rows 3 feet apart.
Plants 1 foot apart in row.

Washington table 2. Yields and percentages of U.S.D.A. Seedlings grown at Puyallup, Wash., in 1947.

Variety	Yield per acre of U.S. No. 1 tubers		Maturity
	Bushels	Percent	
B 61-3	774	94	
B 69-16	1016	94	
B 70-5*	920	95	Midseason
B 75-4	629	96	
B 76-43	871	96	
B 87-1	574	93	
B 91-14	605	98	
B 137-5*	1113	99	Midseason
B 142-7	714	95	
B 287-27	690	97	
B 311-41*	895	97	Early
B 381-2*	617	93	Early
B 469-5*	992	99	Midseason
B 499-3	460	93	
B 499-7	1597	99	
B 503-12	545	95	
B 503-36	847	97	
B 505-22	Rogued		
B 505-38	895	99	

Washington table 2. (Continued)

Variety	Yield per acre of U.S. No. 1 tubers		Maturity
	Bushels	Percent	
B 505-41	1936	99	
B 505-71	726	98	
B 505-75	726	99	
B 591-47	629	92	
B 591-64	992	96	
B 592-21	847	91	
B 592-66	629	92	
B 592-77	702	97	
B 592-79	774	89	
B 593-5	511	100	
B 593-7	797	94	
B 594-47	484	98	
B 595-51	629	84	
B 595-84	387	76	
B 595-104	653	98	
B 595-137	738	94	
B 595-175	920	98	
B 595-189	944	96	
B 595-210	701	93	
B 596-7	968	96	
B 604-2	895	92	
B 604-3*	726	96	Midseason
B 604-5	653	95	
B 604-8*	895	99	Early
B 604-10*	726	96	Early
B 604-12	799	99	
B 604-20*	557	96	Early
B 604-22	1041	98	
B 606-30	895	90	
B 606-37	Rogued		
B 606-77*	641	96	Midseason
B 606-92	1234	93	
B 608-55	484	91	
B 608-115	629	95	
B 608-126	460	97	
X 150-10	424	90	
X 403-5	1065	92	
X 494-1	992	95	
X 590-7	702	99	
X 927-3*	1041	91	
Menominee	944	95	Midseason

* Promising selections in Puget Sound area.

WASHINGTON (Pullman)

Seth Barton Locke

Testing for resistance of potato varieties to field infection with leaf roll virus was continued in 1947 at 3 locations in Washington. Data on the amount of leafroll infection occurring in 1946 were obtained from samples taken from the plots in the fall of 1946 and planted at Pullman in 1947. These appear in Wash. table 3.

Spread of leaf roll in the experimental plots was less in 1946 than in the preceding year but more than in 1944, being close to the 3-year average. The reaction of some of the varieties was inconsistent with respect to location. However, there was rather close agreement between the average percentage of leaf roll infection occurring in 1946 and the 3-year, 3-location average, i.e., Katahdin showed the least (14%) increase in fection, with Netted Gem and Chippewa showing the greatest increase (55% and 50%, respectively).

When the maximum percentage of leafroll increase occurring in a variety during the 3-year period is used as a basis of comparison a clear-cut grouping of varieties is indicated as follows: Katahdin, 34%: Sequoia, Teton, Earlaine II, White Rose, Seedling 5703, and Houma, 52-66%; Bliss Triumph, Pawnee, Gold Coin, Green Mt., Earlaine, Sebago, Mohawk, Netted Gem, Chippewa, 80-100%.

Washington Table 3. Leafroll spread in potato varieties in Washington.

Variety	Percentage increase in leafroll infection					
	During 1946 at indicated locations				3-year Average ('44,'45,'46)	3-year maximum
	Pullman	Prosser	Everson	Average		
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Bliss Triumph	19.0	32.6	36.1	29.2	29.4	80.1
Chippewa	56.3*	44.1*	49.3	(49.9)	52.5	85.7
Earlaine	25.6	34.8	19.8	26.7	36.1	82.6
Earlaine II	24.0	23.1	20.0	22.4	24.5	63.2
Erie	57.5	49.7	30.2	45.8	--	--
Gold Coin	72.4	12.6	13.0	32.5	32.4	79.8
Green Mt.	35.6	31.3	14.2	27.1	33.9	83.3
Houma	34.3*	24.3*	14.8	(24.5)	31.4	61.3
Irish Cobbler	57.1	39.9	22.0	39.7	--	--
Kasota	41.6	17.5	14.9	24.7	--	--
Katahdin	14.1	34.3	11.0	19.8	14.1	34.3
Mesaba	66.2	8.5	15.3	30.0	--	--
Mohawk	18.5	29.1	56.5	34.7	41.3	80.4
Netted Gem	95.4	37.0	33.5	55.3	52.4	95.4
Pawnee	61.7*	11.0*	24.6	(32.4)	29.7	100.0
Red Warba	49.7	24.4	28.6	34.2	--	--
Sebago	53.6*	18.1*	66.1*	(45.9)	41.0	85.9
Sequoia	16.5	31.7	27.1	25.1	20.7	51.9
Seedling 5703	38.7*	11.9*	25.6	(25.4)	28.1	61.7
Teton	12.0	21.7	30.0	21.2	22.8	65.9
Warba	23.7	18.2	2.9	14.9	--	--
White Rose	45.2	5.3	13.5	21.3	24.6	52.2

*Data supplied by interpolation in absence of observed values.

WASHINGTON (Mt. Vernon)

T. E. Randall

Tests of seedlings for field resistance to leaf roll have been conducted in western Washington from 1943 through 1947. The tests primarily involved 400 single-tuber lots derived from 98 crosses made by the U. S. D. A., together with 25 multiple-tuber lots from the same source, all received in November 1942. Additional seedling lots involving 33 crosses and 84 lines were included in the tests in the period from 1944 to 1946. In the first year one plant per line was tested. In the second year 4 or more plants were tested for each line. The tests were conducted in an area known to have shown a considerable spread of leaf roll in previous years. The aphid population was extremely heavy both years, and all plants showed heavy infestations of aphis. In 1943, 19.1 percent of the lines became infected with leaf roll. In 1944, 29.6 percent of the remaining lines became infected with leaf roll. Of the 475 initial lines, 42.7 percent had become infected by the end of the 1944 season. Of the 114 lines tested in 1944, 28 percent showed from 5 to 72 percent of the plants infected, 14 percent of the lines showed 75 to 99 percent infected plants, and 58 percent of the lines showed 100 percent infected plants. Of the remaining 272 lines showing no leaf roll at the close of the 1944 season, 89.7 percent showed leaf roll by the end of the 1947 season; 8.8 percent of the remainder were listed in the doubtful category because of complicating factors making the readings uncertain in 1947. Only 1.5 percent were still free from leaf roll symptoms at the end of the 1947 season. It is possible, however, that they may have become infected late in the 1947 season. In 1945, 1946, and 1947 the tests were conducted with alternating rows of test lines and lines known to be carrying 80% or more leaf roll.

The lines that were still free from leaf-roll symptoms at the end of the 1947 season were all derived from a single seedling from each of the following crosses: 528-229 x 528-170, Katahdin x 96-56, 245-52 x 528-229, and 47452 selfed.

528-229 x 528-170 seedling is late maturing, only slightly resistant to late blight, leaves small with smooth surface, foliage open in appearance, upright habit, and is moderately vigorous. 245-52 x 528-229 seedling is medium late in maturity, only slightly resistant to late blight, leaves small with smooth surface, dense foliage, spreading habit and is very vigorous. The result of one year's test indicates that it may carry resistance to flea beetle both in the foliage and tubers. Katahdin x 96-56 seedling is late maturing, highly resistant to late blight, leaves small with slightly rugose surface, moderately dense foliage, upright habit and bery weak in growth. The No Blight x Earlaine seedling is late in maturity, moderately resistant to late blight, leaves small with moderately smooth surface, medium dense foliage and upright habit. None of these seedlings have proved to be self-fertile in the field. Samples of these seedlings have been sent to Beltsville, Md., and Prosser, Wash., for further tests.

Seed from 64 crosses and 199 multiple-tuber lots have been received from the U. S. D. A. for a continuation of the program in 1948.

WASHINGTON

C. L. Vincent

In 1947, 22 named potato varieties and 6 numbered sorts were planted for yield and adaptability and for leaf roll resistance studies. Two strains of certified Russet Burbank (Netted Gem) were among the named sorts.

All varieties were replicated 4 times in 25-hill units according to a standard randomized plan. Plantings were made at Prosser, under irrigation, and at East Stanwood and Pullman, without irrigation. The soil at Prosser was a Sagemore fine sandy loam, at Pullman a Palouse silt loam, and at East Stanwood a muck soil.

In practically all cases, the varieties yielded heavier at East Stanwood than at either of the other places. At East Stanwood, in western Washington, Sequoia, White Rose Green Mountain, Essex, Calrose, B 70-5, Ontario, Erie, Kasota, Ashworth, Mohawk and Netted Gem gave outstanding yields, the spread being 18 tons or better per acre.

At Prosser, with irrigation, Chippewa, Essex, Pawnee, White Rose, B 70-5, Cross 1276-185, Netted Gem, Green Mountain, Teton, 24-38-3, Ashworth, Sequoia, Ontario, and Carlrose yielded 14 tons or better per acre.

At Pullman, the driest of the three sections, Red Warba, B 70-5, Sebago, Essex, Cross 1276-185, Ontario, and Sequoia produced yields of 10 to 11 tons per acre when computed from plot to an acre basis. (See Wash. table 4).

The resistance of potato varieties to leaf roll is reported by Seth B. Locke of the Division of Plant Pathology who is making a study of this phase of potato growing.

A planting of 25 potato varieties was made at East Stanwood in muck soil to study their individual resistance to scab. These were furnished by W. C. Edmundson, U. S. D. A., Greeley, Colo. Because of the limited number of tubers of each seedling, the data presented in Washington table 4 represent single-row plantings only of each numbered sample sent.

Seedlings 6321, 5244, 6330, 6316, and 4885 were also grown in western Washington in 1946 on silt loam soil. Scab organisms were much more prevalent in this soil than in the muck soil. After 2 years of preliminary studies, 6316 and 4885 each show high resistance to scab under the conditions tested. No 6316 has 20 percent of its tubers infected with scab in 1946 and 5.5 percent in 1947, while 4885 showed 4 percent infection in 1946 and 2.6 percent in 1947. Seedling 6330 was consistent showing 53 percent infection in 1946 and 63 percent in 1947.

It is difficult to explain the wide differences in scab resistance obtained in seedlings 6321 and 5244 as grown under these conditions. In 1946 Seedling 6321 showed no resistance to scab while in 1947 only 7.9 percent of the tubers were infected. Seedling 5244 showed 52 percent infection in 1946 and 11.6 percent in 1947.

As a result of studies in 1947, seedlings that had less than 10 percent scab-infected tubers when grown in muck soil are: 5218, 3175, 3436, 4887, 4885, 7522, 4471, 6362, 6824, 6316, 3629 and 6321.

Wash. table 4. Yield test of potato varieties in 1947
(Average of four replications at each location)

Variety	Places Grown						Av. Yield No. 1 tubers per acre of 3 areas
	Prosser, Wash.		E. Stanwood, Wash.		Pullman, Wash.		
	Total yield per acre	Yield No. 1 tubers per acre	Total yield per acre	Yield No. 1 tubers per acre	Total yield per acre	Yield No. 1 tubers per acre	
	Tons	Tons	Tons	Tons	Tons	Tons	
Sequoia	14.2	13.6	29.7	29.2	11.3	10.2	17.7
Netted Gem (1)	14.7	13.6	18.4	17.3	8.4	5.6	12.2
Chenango	13.1	12.0	14.5	13.6	8.3	4.7	10.1
24-38-3	14.5	12.9	16.9	15.6	10.9	8.5	12.3
White Rose	15.6	14.3	26.5	25.7	8.1	5.7	15.2
Calrose	14.0	12.7	23.6	22.7	10.4	8.1	14.5
Essex	17.1	16.0	24.9	23.2	12.5	10.7	16.6
Teton	14.9	14.0	17.4	17.0	8.5	7.6	12.9
B70-5	15.6	14.9	22.0	21.6	12.2	11.2	15.9
Ontario	14.0	13.1	21.5	20.8	12.7	10.5	14.8
Chippewa	18.4	17.4	17.4	16.7	7.4	6.7	13.6
Sebago	11.6	10.9	17.4	16.9	11.9	11.1	13.0
Cross 1276-185	15.8	14.7	18.7	17.8	12.2	10.5	14.3
Kasota	11.1	10.4	20.2	19.1	10.4	8.5	12.7
Netted Gem (2)	15.1	14.2	18.7	17.3	8.0	6.4	12.6
Erie	10.5	9.8	21.8	21.1	11.2	9.6	13.5
CS 4887	12.0	11.4	17.3	15.6	--	--	--
Katahdin	13.5	13.3	16.6	16.2	8.6	8.1	12.5
Ashworth	14.2	13.8	19.9	19.2	11.1	9.8	14.3
Mesaba	12.2	11.6	15.8	15.1	--	--	13.3
SND 48-2	11.5	10.7	11.5	10.3	8.5	7.0	9.3
Red Warba	12.4	12.0	16.3	14.9	12.2	11.3	12.7
Mohawk	15.5	14.7	19.3	19.0	7.8	6.8	13.5
Warba	12.0	11.5	13.5	12.5	11.4	9.6	11.2
Pawnee	16.4	16.0	15.7	15.1	6.0	5.1	12.1
Cayuga	12.9	12.2	14.7	13.6	8.9	5.4	10.4
Gr. Mountain	14.9	14.4	26.3	25.7	7.2	5.6	15.2
CS 6316	11.8	11.3	12.1	11.7	--	--	--

Wash. table 5. Scab-resistant potato variety studies
East Stanwood, Washington

Potato plots planted and harvested by C. L. Vincent.
Date of planting: May 9, 1947.
Date of harvest: September 20, 1947
Soil type: Muck.
Planting distances: 1 foot x 3 feet

Scab-resistant potato varieties from W. C. Edmundson, Greeley, Colo.	Hills harvested	Total Wt. of potatoes harvested	Yield of No. 1 potatoes	Per acre yield No. 1 potatoes computed from Hill plantings	Potatoes harvested (by count)		Percentage of total scabby
					Total	No. scabby	
	No.	Lb.	Lb.	Ton			Pct.
7412	20	26.0	22.5	8.1	126	73	57.9
7579	20	18.5	13.0	4.7	117	18	15.4
6819	17	20.5	18.5	6.8	90	15	16.7
6526	20	27.0	20.5	7.5	140	39	27.9
6824	19	19.0	17.0	6.5	83	4	4.8
3436	20	34.0	29.0	10.5	154	3	1.9
7294	20	24.5	23.0	8.3	70	58	82.9
5218	20	28.0	23.5	8.6	142	2	1.4
6362	20	28.5	26.0	9.4	92	4	4.3
7457	20	50.0	49.75	18.1	101	11	10.9
3175	20	35.5	32.5	11.8	128	2	1.6
7522	20	43.0	42.0	15.2	136	4	2.9
7377	20	31.0	28.5	10.4	106	63	59.4
6361	20	32.5	30.0	10.9	120	7	59.3
7432	20	47.0	45.0	16.3	162	99	71.1
3529	20	30.5	30.5	11.1	124	52	41.9
*6321	18	24.5	23.5	9.5	72	5	7.9
4471	20	34.0	31.5	11.5	114	4	3.5
*5244	20	55.5	51.5	18.7	129	15	11.6
3088	20	38.5	36.5	13.3	113	19	16.8
*6330	20	46.0	41.0	14.9	160	101	63.1
3629	20	22.5	20.0	7.3	103	6	5.8
CS 4887	25	63.5	59.0	17.1	170	4	2.4
CS *6316	25	41.0	40.0	11.6	110	6	5.5
*4885	25	68.5	65.0	18.9	189	5	2.6

*These were also included in the 1946 Washington tests.

WASHINGTON (Prosser)

J. D. Menzies

Tests of field resistance to leaf roll among potato varieties and seedlings were continued in 1947 in cooperation with the U. S. Department of Agriculture. Preliminary screening tests were given to 127 lines, and 5 lots were retested from the group used in 1946.

All of the seedlings developed some symptoms of either current-season or chronic leaf roll when planted in the field adjacent to rows of infected plants. Amount of infection, however, ranged from a trace to 100 percent and differences between adjacent lots were often so striking as to leave no doubt that actual field resistance (or disease-escaping tendencies) exists. Notable among the least diseased lots may be listed the following: B 591-6, B 609-23, B 1116-1, B 73-16, B 725-56, B 725-31, B 579-3, B 505-44, B 1115-12, and 1276-185. The last-named seedling was obtained later than the rest and therefore had about 2 weeks less exposure. Only one infected plant among 43 occurred with this seedling It is interesting to note that in the list above B 1116-1 is a selfed seedling of 1276-185 and B 1115-12 is a selfed seedling of 1276-43. The behavior of these three, the only ones in the test with 1276-parentage, may indicate a family line with field resistance to the disease here. It should be noted that 1276-185 has been reported as promising in Maine as far as leaf roll resistance is concerned.

Two of the lots retested were B 401-3 and Sebago. The former showed no current-season leaf-roll symptoms in 1946 and gave the same result in 1947. Tubers from the 1946 test, however, yielded 77 percent chronic leaf roll, and 9 percent of this type appeared in the 1947 planting. It is therefore concluded that B 401-3 is susceptible but under our conditions expresses no definite current-season symptoms. Sebago was retested because the 1946 leaf-roll symptoms were doubtful. This variety, however, expressed definite symptoms, with 20 percent infection, in 1947, and showed a 68% tuber carry-over from the 1946 plot.

The other three lots retested were the varieties Norkota, Sequoia and Teton. These had shown respectively 6,22, and 97 percent current-season leaf roll in 1946 and were retested to see if the wide difference in reaction would be repeated. The 1947 performance was 12, 14, and 48, respectively, which shows the same ranking but less strikingly.

An unusual outbreak of late blight occurred in the lower Yakima Valley this year. There was, therefore, an opportunity to rate the potato seedlings and varieties for resistance to this disease. Disregarding the early sorts which were mature when blight appeared, the outstanding seedlings are rated against some standard varieties in table 1. The weather was unusually wet for this area and the varieties suffered a severe blight exposure. Two lots were strikingly resistant to blight producing only a few inconspicuous leaf lesions. These were B 725-61 and B 355-67.

An observation regarding the reaction of seedling B 579-17 to leaf roll infection is of interest. Early infections on this variety were associated with non-abscission of the unfertilized blossoms. The persistent flower parts born on the erect inflorescence stalks were very conspicuous. No fruits nor persistent blossoms occurred on healthy plants or on plants showing symptoms after August 18. This may be related to the tendency for current-season infection to encourage fruit set (usually sterile) on Russet Burbank.

Note: Details of the 1947 leaf roll tests are appended to this report.

TABLE I (Prosser): Comparative late blight resistance of certain potato varieties and seedlings grown at Prosser in 1947.

Variety or seedling No.	Comparative blight damage %
Russet Burbank	100
White Rose	100
Potomac	60
Sequoia	50
Sebago	40
B 609-23	20
B 505-28	10
B 725-35	10
B 725-37	10
B 355-67	t
B 725-61	t (1)

(1) Only a trace of blight.

RESULTS OF 1947 TEST OF POTATO VARIETIES AND SEEDLINGS FOR FIELD RESISTANCE TO THE LEAF ROLL DISEASE. PROSSER, WASHINGTON

Pedigree No.	Parentage	No. Plants	Leaf roll No.	Leaf roll Approx. %
B 725-20	B 336-184 x Teton	11	11	100
21	"	8	3	37
43	"	8	6	75
22	"	9	4	44
3	"	10	6	60
2	"	10	5	50
32	"	5	2	40
47	"	7	6	85
34	"	7	6	85
44	"	10	5	50
6	"	10	7	70
33	"	12	2	17
1	"	9	9	100
49	"	19	19	100
19	"	8	3	37
50	"	10	3	30
15	"	9	2	22
42	"	10	10	100
52	"	3	3	100
31	"	8	1	12
B 725-13	B 336-184 x Teton	7	7	100
60	"	12	9	75
53	"	13	13	100
12	"	9	6	66

Pedigree No.	Parentage	No. Plants	Leaf roll No.	Leaf roll Approx. %
B 725-63	B 336-184 x Teton	13	3	24
7	"	5	5	100
30	"	9	9	100
9	"	8	8	100
56	"	10	1	10
61	"	4	2	50
4	"	11	11	100
40	"	11	9	81
27	"	7	4	56
54	"	11	10	90
16	"	8	6	75
57	"	8	8	100
11	"	14	6	42
26	"	8	8	100
45	"	8	8	100
55	"	11	11	100
59	"	8	0	0[1]
B 725-37	B 336-184 x Teton	7	1	14
23	"	6	2	33
48	"	9	1	11
8	"	9	4	44
51	"	10	5	50
5	"	12	10	82
17	"	12	8	66
18	"	7	3	42

Pedigree No.	Parentage	No. Plants	Leaf roll No.	Approx. %
B 725-10	B 336-184 x Teton	12	5	42
28	"	10	1	10
25	"	11	9	81
24	"	10	2	20
35	"	7	1	14
41	"	10	9	90
38	"	10	10	100
62	"	11	6	54
39	"	8	3	37
58	"	11	7	63
29	"	13	12	96
36	"	7	7	100
B 355-67	96-56 x 336-144	35	10	28
B 301-89	Houma x Katahdin	46	6	13
B 445-76	96-28 x 336-144	45	22	48
71	"	44	40	90
93	"	28	9	32
101	"	24	too stunted	
106	"	38	36	94
115	"	33	4	12
B 446-8	96-44 x 336-144	36	11	29
B 457-5	Sebago x B 35-3	56	47	83
B 459-29	Sebago x 96-28	14	too stunted	
B 477-29	Sequoia x 96-28	31	3	10
57	"	33	9	27
B 499-27	o55 x Teton	62	15	24
B 505-28	Chippewa x Teton	40	10	25

Pedigree No.	Parentage	No. Plants	Leaf roll No.	Leaf roll Approx. %	
B 505-44	Chippewa x Teton	41	2	5	
53	"	26	9	35	
57	"	28	6	21	
B 515-2	Russet Burbank x 96-56	39	4	10	Note: Has a net like Russet Burbank.
B 524-5	1241-62 x 792-76	35	6	17	
44	"	35	35	100	
53	"	28	3	11	
B 1115-12	1276-43 selfed	26	2	8	
B 1116-1	1276-185 selfed	43	1	2	
B 541-9	Sebago x B 76-49	29	5	17	
B 570-2	B 24-58 x 247-48	40	4	10	
B 579-2	B 24-58 x Katahdin	38	3	8	
3	"	39	2	5	
4	"	43	6	14	
5	"	36	4	11	
8	"	39	10	25	
13	"	46	4	9	
15	"	35	35	100	
17	"	67	11	16	
20	"	45	7	15	
B 580-20	B 24-76 x B 61-3	36	too stunted		
B 590-4	Green Mt. x B 61-3	39	16	40	
20	"	37	6	16	
B 591-2	Mohawk x B 61-3	28	22	77	
6	"	36	2	6	
9	"	33	4	12	

Pedigree No.	Parentage	No. Plants	Leaf roll No.	Leaf roll Approx %
B 591-14	Mohawk x B 61-3	26	5	20 (2)
33	"	36	4	11
34	"	33	5	15
B 601-11	528-194 x B 61-3	98	19	20
B 606-94	41956 x 96-56	23	5	21
B 607-159	B 83-9 x Teton	62	7	11
B 608-43	B 83-9 x 46952	30	3	10
- 56	"	31	8	24
82	"	66	9	14
B 609-23	Sebago x B 61-3	26	2	8
46422	Longhope x Katahdin	38	3	8
B 73-16	Mohawk x 96-56	31	1	3
B 137-5	Sequoia x 47562	38	4	11
B 70-5	B 127 x 96-56	36	4	11
B 61-3	96-56 x 528-170	40	3	7
B 69-16	Katahdin x 96-56	43	11	25
Sebago	Chippewa x Katahdin	38	7	19
Sequoia	Green Mtn. x Katahdin	51	7	14
Teton	45146 x Earlaine	47	23	48
Norkota	Rural N.Y. x Katahdin (46019)	139	17	12
B 401-3		46	4	9 (2)
B 588-15	Katahdin x 61-3	35	6	17
B 1276-185		26	2	8

(1) All plants showed rolling of basal leaves indicating chronic leaf roll infection.

(2) All infections were chronic (tuber transmitted)

W E S T V I R G I N I A

K. C. Westover

The tests this year were conducted on the Reedsville Farm. About 2,500 individual potato plants, representing 18 family lines, were sent to us by the U.S.D.A. and were under observation in these tests. One hundred selections were made, which will be increased in 10-hill unit planting this coming season. The past season's 10-hill unit planting contained 123 stocks from the U.S.D.A., North Dak., and N. Y., as well as selections made here from family lines received from Minn. in 1946. Twenty-four of the 47 stocks in this seasons' 50-ft. row trials are also being held for further testing either in similar plantings or in our 1948 replicated trials. W. Va. table 1 gives the yield results from this season's replicated trials.

It will be noted in the table that 4 seedling stocks compared favorably in yield with the established varieties. B 434-158, B 313-21, and B 522-8, originally from the U.S.D.A., have been under observation here for some time and appear to be well adapted to the intermediate altitudes. The plants are vigorous, erect growing, medium large, and apparently hardy to warm dry growing conditions. ND 178-3, from N. Dak., is particularly outstanding under our conditions for yield and tuber type.

In our 50-ft. row trials, Chenango, Snowdrift, and Fillmore from Cornell, and seedling stocks 126-37, 207-7, K-5, and 242-3 from N. Dak., as well as B 608-9, a W. Va. selection, and B 527-1 from the U.S.D.A., gave outstanding yields. The tubers of Snowdrift and Fillmore were somewhat irregular and overly large. The plants of the N. Dak. stocks were in general large, erect-growing, vigorous, and blossomed early in the season. The tubers are white to buff, and consistently smooth. The U.S.D.A. stocks blossomed early, were medium size, erect, and vigorous-growing. The tubers were inclined to be somewhat irregular in shape. Very little reliable data are available concerning pest resistance. Samples are available for trial by the Dept. of Plant Pathology in 1948. It is quite probable that for the first time since the beginning of the war we will be able to test some of the newly named varieties and the more promising of the seedling selections in the growing sections of the State this coming season.

In W. Va. Sequoia is rapidly fading from the picture. Cobbler, Sebago, and Katahdin, in this order, are grown most. Menominee is being used quite extensively on scabby soils, and despite its somewhat irregular tuber shape is acceptable on our markets. It yields well. Houma, although used only to a limited extent, is growing in popularity, particularly in the eastern part of the State. The White Rurals, if seed were available, would be used to a much greater extent in the upper altitudes. The contribution of DDT to the control of the leafhopper (Blue Stem) is evidently the reason.

West Va. table I--Yields from 1947 Replicated Potato Variety Trials in Bushels Per Acre, Reedsville, W. Va. (Alt. 1800')

Variety	Source	Yield per acre			
		U. S. No. 1s	Total	Percentage Off Grade	Rank
		Bu.	Bu.	Pct.	
Menominee	Tuber Indexed*	608.2	645.1	7.5	10
Chippewa	N. Y. Cert.	591.8	648.6	8.8	15
Sebago	Maine Cert.	587.6	627.4	6.3	8
ND 178-3	Tuber Indexed	552.8	604.3	8.5	13
Houma	N. Y. Cert.	530.7	590.4	9.9	20
R. Rural	"	526.6	559.4	5.9	5
S. Rural	Pa. Cert.	513.4	538.3	4.6	3
B 434-158	Tuber Indexed	511.4	561.0	8.8	17
Katahdin	Maine Cert.	510.3	554.2	7.9	12
B 313-21	Tuber Indexed	507.5	537.7	5.6	4
Green Mountain	Maine Certified	502.4	526.6	4.6	2
B 522-8	Tuber Indexed	480.7	541.0	11.2	23
Sequoia	"	457.0	477.2	4.2	1
B 137-11	"	439.1	505.9	13.2	25
B 522-12	"	428.5	479.5	10.6	21
47205	"	424.1	474.7	10.7	22
Cobbler	Maine Cert.	423.0	468.9	9.8	19
Ontario	Certified in 1946	408.5	479.2	14.8	26
X-7	Tuber Indexed	406.2	444.2	8.6	14
B 311-52	"	400.1	432.1	7.4	9
B 137-4	"	360.3	395.7	9.0	18
B 471-4	"	335.5	379.8	11.7	24
Mohawk	Cert. in 1946	332.7	350.8	5.9	6
ND 265-3	Tuber Indexed	277.2	304.0	8.8	16
ND 242-1	"	269.6	291.9	7.6	11
B 1017-10	"	203.7	217.1	6.2	7
Potomac	"	169.8	477.2	64.4	27
Least Signif. Diff.		72.6	126.0		

*Maintained here and indexed by the Dept. of Plant Pathology in the early spring.

W I S C O N S I N

G. H. Rieman

Up to the present time it has been comparatively easy to obtain hundreds of scab-resistant seedlings in the late maturity class of Russett Rural or Green Mountain by selfing or crossing the late-maturing European scab-resistant varieties, Arnica, Hindenburg, and Richter's Jubel. It has been quite another matter to obtain large numbers of early-maturing segregates possessing high scab resistance from these late resistant parents of European origin. The common association of late maturity with high scab resistance and early maturity with scab-susceptibility in parental forms or in segregating populations may be a fundamental physiological correlation concerned with the nature of resistance in the host. Probably a more plausible explanation of this association rests in the fact that thus far only late-maturing scab-resistant and early-maturing scab-susceptible parental breeding cultures have been available for breeding studies. Thus, close genetic linkages of the genes responsible for the two pairs of contrasting characters might account for the associations frequently observed. Autotetraploid tetrasomic inheritance in Solanum tuberosum as first shown by Muller would also account for the difficulties encountered in bringing together early maturity and high scab resistance in a single individual. This is especially so if one considers that the two contrasting characters under consideration behave in a complex manner in inheritance. There is cytological evidence that multivalent pairing of the chromosomes may also add to the complexity of the inheritance pattern.

The scab-resistant Menominee variety which was used rather extensively in a breeding program produced a high percentage of late-maturing segregates showing resistance to scab. Menominee was selfed and crossed with seven scab-resistant seedlings obtained from double crosses of the following parentage:

302.41- 6	(Cobbler x Hindenburg)	x (Chippewa x Hindenburg)
302.41- 7		"
303.41-31		"
316.41-18	(Cobbler x Jubel)	x (Chippewa x Hindenburg)
318.41-18	(Houma x Jubel)	x (Chippewa x Hindenburg)
318.41-28		"
318.41-32		"

The scab-resistant single cross segregates used in producing these double cross segregates were, for the most part, different individuals but they were all late in maturity. The double cross segregates with both Jubel and Hindenburg appearing in their parentage exhibited more resistance to scab than those with the same resistant parent appearing twice in the pedigree.

The Menominee crosses listed in table 1 produced on the average higher percentages of early resistant seedlings than either the Menominee variety selfed or the selfed double crosses. The Menominee variety apparently possesses only a few genes for early maturity since no early selections were made in its selfed progeny. Likewise, the seven parents derived from double crosses produced discouragingly low numbers of early seedlings in their selfed progenies indicating that they possess only a few genes for earliness.

Wis. table 1. Early scab-resistant selections obtained from Menominee crosses, 1947.

Variety and seedling	Original seedling population	Selections based on type	Selections based on earliness	Selections based on scab-resistance and earliness
	No.	No.	No.	No.
Menominee x 302.41-6	1,070	187	30	16
302.41-6 selfed	365	73	2	2
Menominee x 302.41-7	510	55	2	0
302.41-7 selfed	378	13	0	-
Menominee x 303.41-31	460	64	5	2
303.41-31 selfed	176	5	0	-
Menominee x 316.41-18	504	75	2	1
316.41-18 selfed	358	36	0	-
Menominee x 318.41-18	604	52	2	0
318.41-18 selfed	312	17	0	-
Menominee x 318.41-28	473	158	7	2
318.41-28 selfed	322	59	1	0
Menominee x 318.41-32	700	115	3	2
318.41-32 selfed	158	32	0	-
Menominee selfed	846	71	0	-
Totals	7,236	1,012	54	25

Seedling number 302.41-6 appears to be a desirable breeding culture for the development of early scab-resistant varieties. Unfortunately its resistance to scab is not as high as some of the other double crosses listed in table 1. Seedling 302.41-6 crossed with Menominee produced a fair percentage of individuals of excellent white tuber type. A moderate number of early segregates showing resistance to scab were obtained from this combination.

In 1947 yield tests of 17 varieties were grown at Antigo, Rhinelander and Waupaca. Pontiac ranked number 1 in yield at Antigo followed closely by Ontario, Menominee and Chippewa. At Rhinelander, Sequoia and White Rose ranked first although Pontiac, Ontario and Menominee were not far behind. In the tests at Waupaca Pontiac again ranked first. (Wisc. table 2).

Wis. table 2.--Potato Variety Yields in Wisconsin--1947
(Yields based on four 25-hill replicates)

Variety	Antigo per acre	Rhinelander US 1 per acre	Waupaca US1 per acre	Average
	Bu.	Bu.	Bu.	Bu.
EARLY				
Red Warba	276	221	272	256
Cobbler	221	181	254	218
Triumph	237	198	215	217
MID-SEASON				
Chippewa	304	240	223	256
LATE				
Pontiac	327	245	293	288
Ontario	321	259	190	257
Menominee	313	250	165	243
White Rose	202	272	234	236
Sebago	270	191	247	236
Katahdin	253	192	254	233
Russet Sebago	264	206	213	228
Erie	249	229	205	228
Green Mountain	274	191	194	220
Sequoia	207	274	148	210
Russet Rural	219	177	149	182
Mohawk	182	153	187	174
Hindenburg	215	124	58	132

W Y O M I N G

Wm. A. Riedl, G. H. Starr and Fred I. Frosheiser

The potato-breeding work in 1947 was conducted along the same lines as those reported for the last few years.

Ring Rot Resistant Varieties

Eight ring rot resistant varieties, two varieties supposedly intermediate (Red McClure and Russet Burbank), and Bliss Triumph, a susceptible variety, were inoculated with the ring rot bacteria obtained from susceptible varieties. These were planted in 10-hill rows, replicated 4 times. A similar test was made using the same varieties but inoculated with bacteria obtained from resistant varieties. Readings of vine symptoms were made August 21 and September 7. The percentage of plants showing vine symptoms are as follows:

Varieties	Inoculated With Inoculum From: Susceptible Varieties	Inoculated With Inoculum From: Resistant Varieties
	Pct.	Pct.
Bliss Triumph	100	100
Russet Burbank	87	53
Red McClure	47	13
Average of 8 resistant varieties	3 *	3 *

Note percentages shown marked with * were read as questionable ring rot plants. The tubers of these and those of apparently healthy plants were saved and will be checked for ring rot infection.

Tests conducted the past season at two locations in Wyoming gave additional information on the relative pathogenecity of inoculum taken from varieties that are resistant, intermediate, and susceptible to ring rot infection. These classes were represented by Teton, Red McClure, and Bliss Triumph, respectively. Inoculum from each of the above varieties was used to inoculate seed pieces of all 3 varieties and, in addition, the Burbank. These seed pieces were planted in 10-hill rows, replicated twice. The plants were inspected at various intervals for ring rot symptoms.

Inoculum from the susceptible variety, Bliss Triumph, produced as much if not more ring rot in the plants (both in percentage and severety) than the inoculum from the resistant Teton. The inoculum from Red McClure was usually intermediate in its effect.

Microscopic examination of slides made from infected stems of the above varieties showed the following results: (1) Bacteria were most prevalent when inoculum came from the Bliss Triumph variety, followed by the Teton, and Red McClure; (2) as an average result of all inocula, bacteria were relatively few in Teton stems as compared with the Bliss Triumph, Red McClure, and Burbank stems, all of which showed a great prevalence of bacteria.

This information tends to contradict the idea that inoculum from resistant varieties might be more pathogenic than that from susceptible varieties.

Several other ring rot tests were conducted during 1947 but to date these have not been completed.

Scab Resistance

During the past season, 42 potato seedlings were tested in scab-infested soils at the Agronomy Farm near Laramie. These were planted in 5-hill units, replicated 3 times in a randomized manner, together with the Bliss Triumph checks, which were planted in every third row. Of the seedlings tested, 14 had marked resistance to scab and had considerable promise in yielding ability. The following lines were saved for further testing: U.S. 528-118, 1471, 1863, 2537, B-395-5, B-395-13, 104-2, Colo. 6317, 6364, 6992, 7285, 7918, Iowa 116-13 and Wyo. 471.

Moisture and Scab Prevalence

Samples of potatoes taken from an irrigation experiment at the Agronomy Farm, Laramie, were inspected for the presence of scab. This test included four series of plates varying from light to heavy irrigation, each having four randomized replications. The two series receiving the most irrigation water produced significantly more scab than the two series receiving the least water. However, the differences were not as great as those obtained previously because of excess rainfall which minimized the moisture differences between the high and low series.

Inheritance of Tuber Set

Thirty selections representing the range of tuber set in each of 10 segregating seedling families representing the selfs and all possible crosses of two high-tuber-set and two low-tuber-set clonal lines and the 4 parental lines grown in 5-hill rows and replicated 4 times. At harvest the number of stems and tubers per hill were obtained. These data are now being summarized to determine the inheritance of tuber set.

Psyllid Yellow Resistance

Eighteen promising seedlings were tested for resistance to psyllid yellows. The Bliss Triumph variety was used as a check. There was a relatively high population of psyllids on the plants in this trial, and only one variety yielded higher than the Bliss Triumph check. The testing for resistance to psyllid yellows will probably be discontinued next year because no varieties or seedlings have been found to give satisfactory yields under conditions of heavy psyllid infestations.

Seedling Observation Trial

Twenty seedlings were grown in 4-hill rows for observation. Of these 11 were saved for further observation.

Seedling Yield Trial

Twenty-nine seedlings were grown in the seedling yield trial. They were planted in 60-hill rows, replicated twice. Notes were also taken on scab and tuber type. The most promising seedlings will be tested again next year.

Variety Yield Trial

Variety yield trials were conducted at Laramie and Torrington. Eighteen varieties and 2 unnamed seedlings were tested at Laramie in 60-hill rows, replicated 4 times.

The trial at Torrington consisted of 12 varieties and 11 unnamed seedlings planted in 50-hill rows, replicated 4 times. The yields of the more important varieties are shown in Wyo. tables 1 and 2. The new Teton variety, in the Torrington trial, yielded significantly more than any other standard variety in both total yield and yield of U. S. No. 1.

Wyo. table 1. Potato Variety Trials at Laramie, Wyo. (elevation 7,200 feet), 1947

Variety	Total yield per acre	U. S. No. 1 per acre
	Bu.	Bu.
White Rose	497	394
Pontiac	479	407
Kasota	433	398
Red Warba	382	312
Irish Cobbler	375	331
Teton	360	313
Russet Rural	360	328
Katahdin	345	310
Early Ohio	345	268
Bliss Triumph	341	300
Red McClure	333	268
Difference required for significance (5% point)	49	50

Wyo. table 2. Potato variety trials at Torrington, Wyo. (elevation 4,100 feet), 1947

Variety	Total yield per acre	U. S. No. 1 per acre
	Bu.	Bu.
Teton	558	426
Red Warba	484	252
Pontiac	482	361
Katahdin	445	364
Pawnee	440	362
Kasota	434	322
White Rose	396	217
Irish Cobbler	394	238
Great Scott	370	225
Russet Rural	363	282
Bliss Triumph	341	204
Difference required for significance (5% point)	56	45